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Albert Körtum und
Dr. Eduard Schmidt

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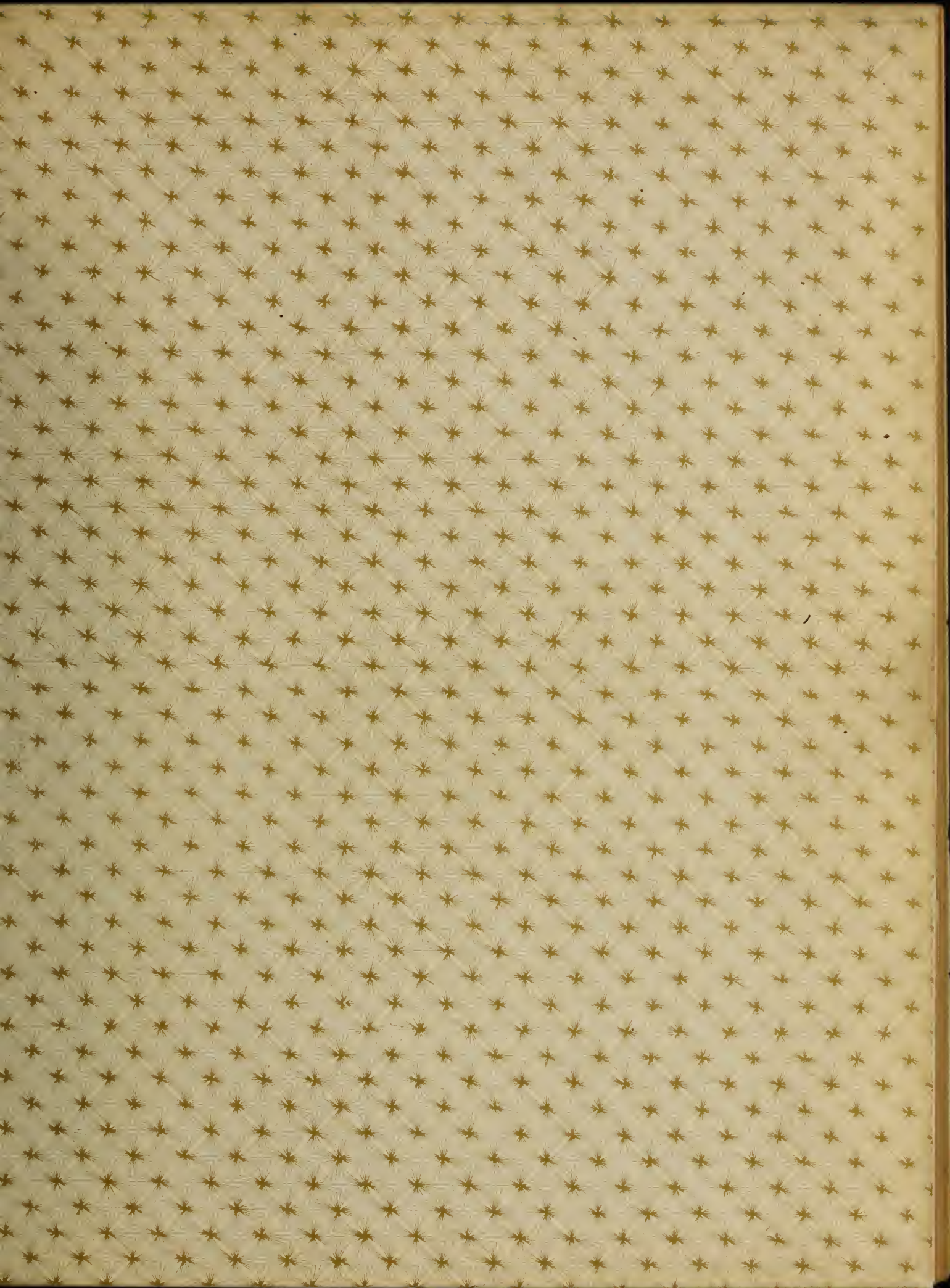
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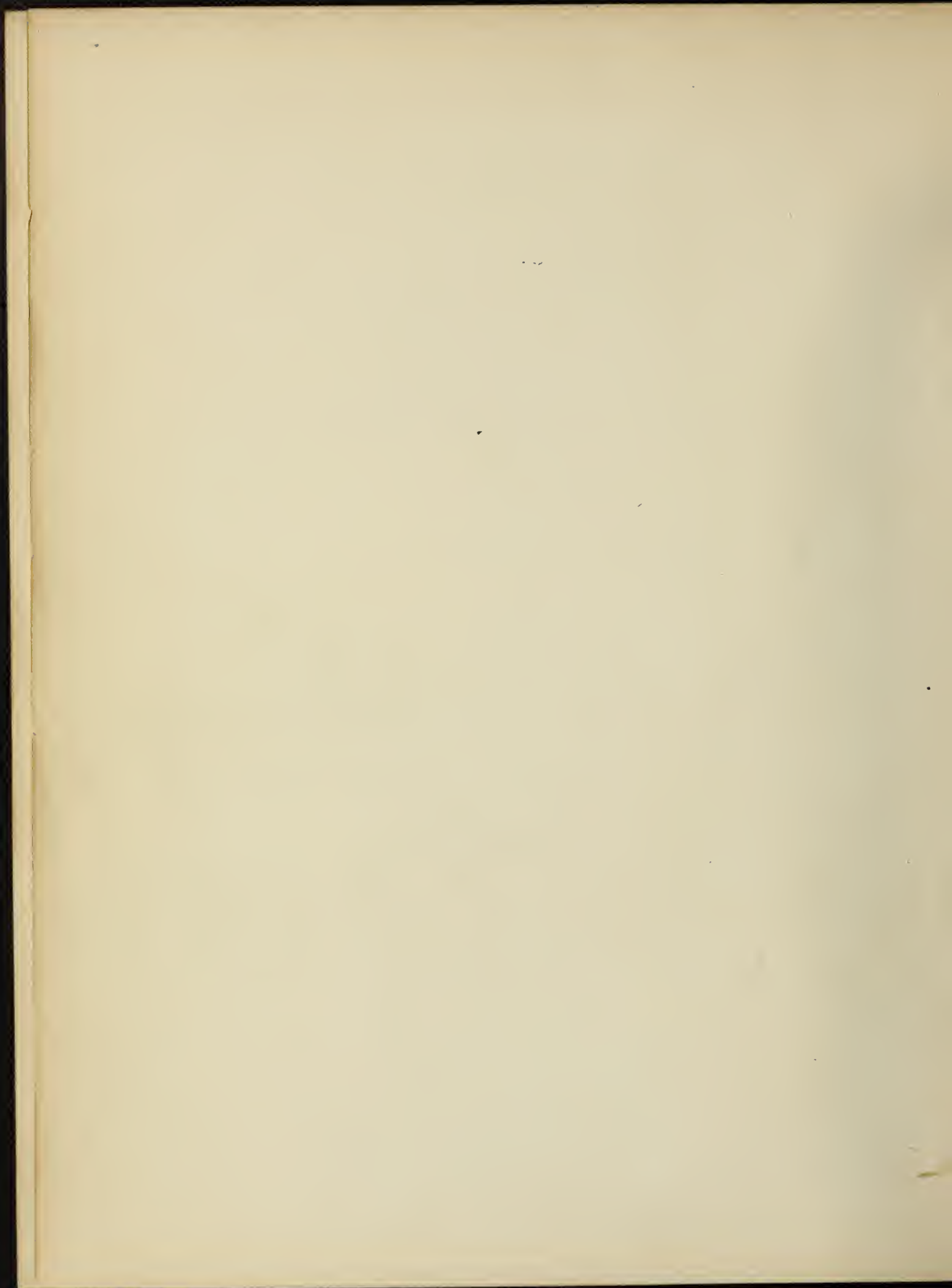
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B I B L I O T H E K E N

von

ALBERT KÖRTUM und DR EDUARD SCHMIDT

translated from

HANDBUCH DER ARCHITECTUR

by

W I L L I A K A T H R Y N G A R V E R

THESIS FOR THE DEGREE OF BACHELOR OF LIBRARY SCIENCE

in the

STATE LIBRARY SCHOOL

U N I V E R S I T Y O F I L L I N O I S

1903.

ALPHABETICALLY

AND

SYNONYMICALLY

OF THE

ENGLISH LANGUAGE

BY

JOHN W. H. WOOD

OF THE UNIVERSITY OF CHICAGO

CHICAGO

UNIVERSITY OF CHICAGO PRESS

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UNIVERSITY OF ILLINOIS

29 May 1903

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Willia Kathryn Garver

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IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE

OF Bachelor of Library Science

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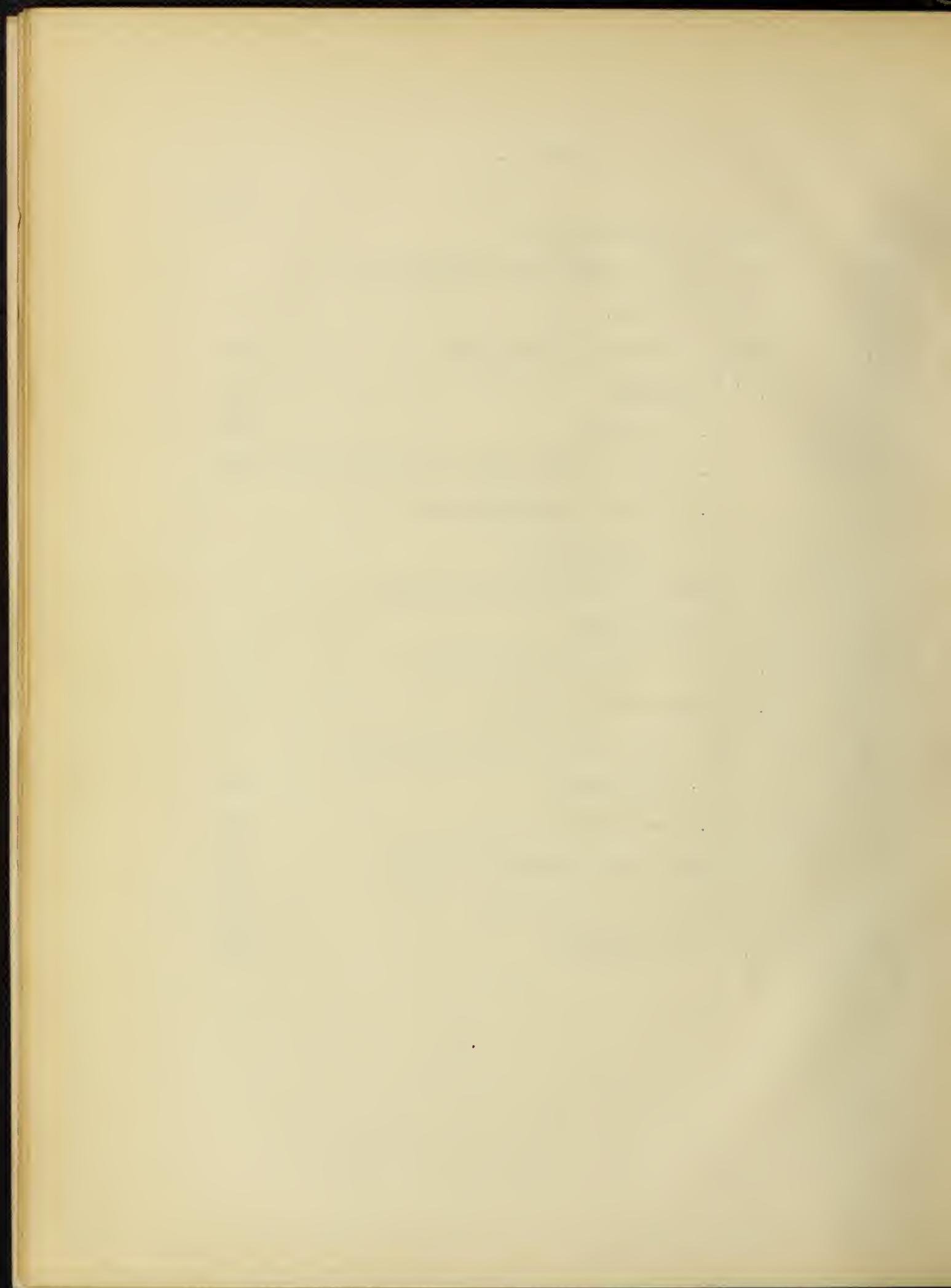
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PREFACE.

THE ORIGINAL OF THIS TRANSLATION APPEARED IN HANDBUCH DER
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ILLUSTRATIONS IN THE ORIGINAL ARTICLE.

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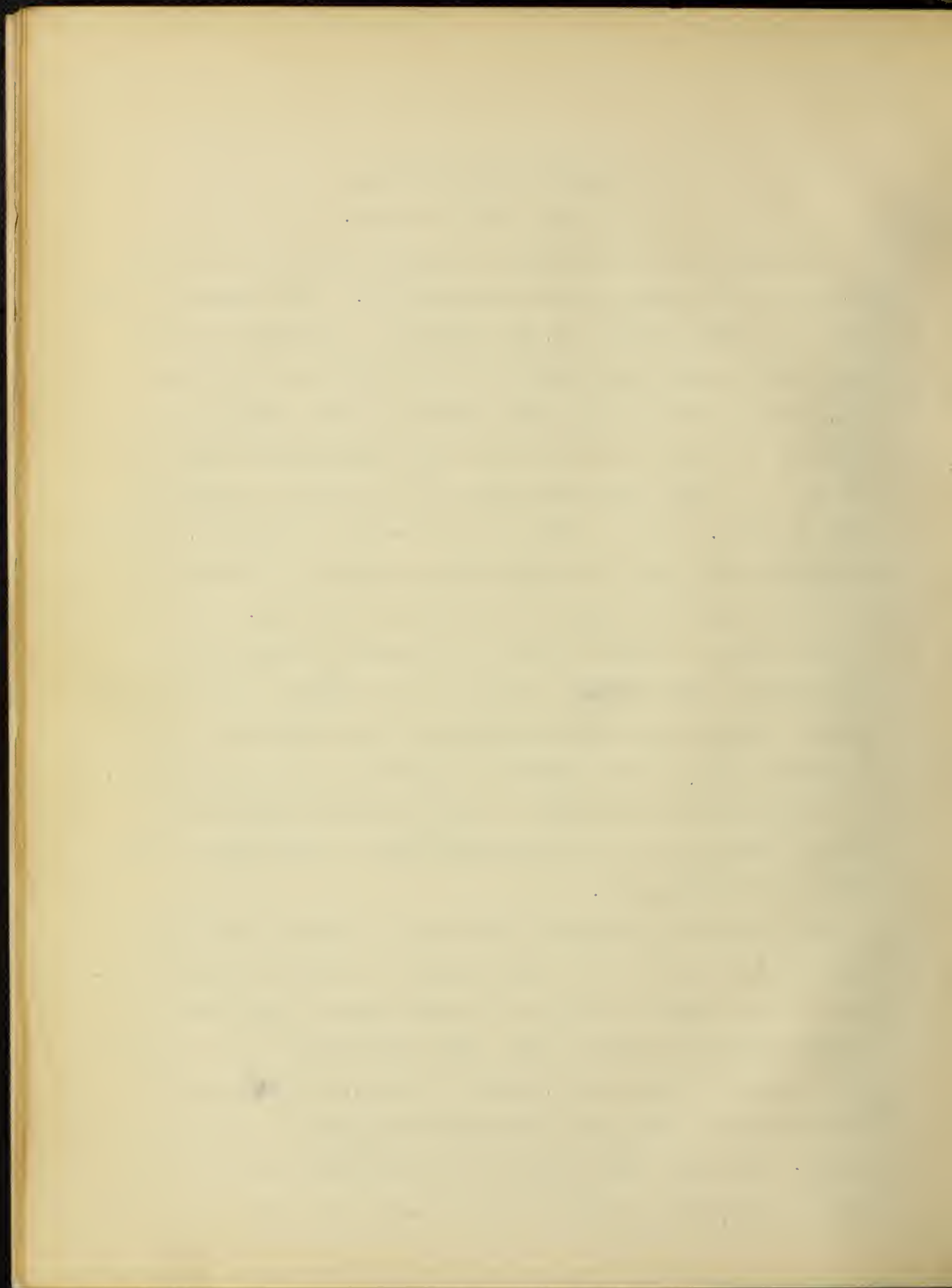


a- General and historical

34- Object and difference.

Through the art of printing the production and use of books has grown, as it seems, in one unbroken line. Since books no longer have to be copied one by one, the making of a thousand is now accomplished as easily as formerly was the production of a single book. On the other hand the great number of books issued at the same time is limited since the books are, comparatively speaking, worn out in a short time from usage and from passing through millions of hands. It is a common experience that every book, that is one hundred years old, has become rare on account of its age and that this rareness increases in proportion to its age. If in our time the private library as well as the public library with its easy access to books forms and incites the student, it is yet indubitable that in the future on account of the increasing culture and specializing in every branch of knowledge, art and profession, the necessity of the existence of larger and more public collections of books which we call libraries must be considered as permanent and indispensable.

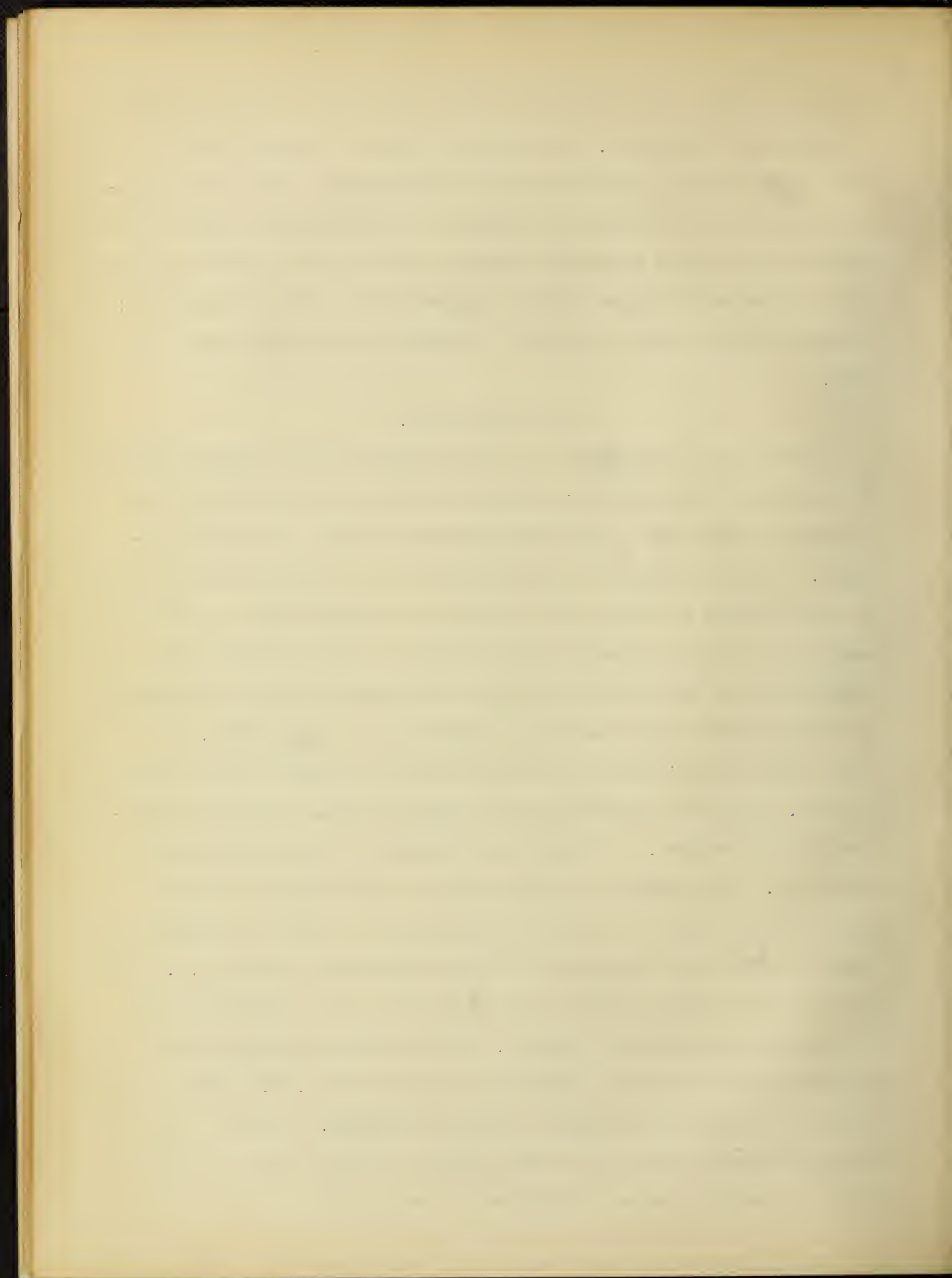
By a library is hereafter, according to Gräsel to be understood a collection of books with the aim of private and public use. That a library must be classified to merit such a name Molbech especially emphasizes when he says, "The mere existence of a mass of books collected in one place, packed in cases, stored away like fuel or piled up like wares and commodities does not constitute a library. This name only applies if a considerable collection of books is classified suitably in one or more book rooms. By the word



library is meant the building in which the books are kept as well as the books themselves. In the following the largest public (Staat und Landes) libraries are to be discussed, then the university libraries, the smaller libraries of the technical high schools, academies and other secondary schools besides the libraries belonging to museums and those allied to scientific and art institutes; neither will the city and public libraries be excluded from treatment.

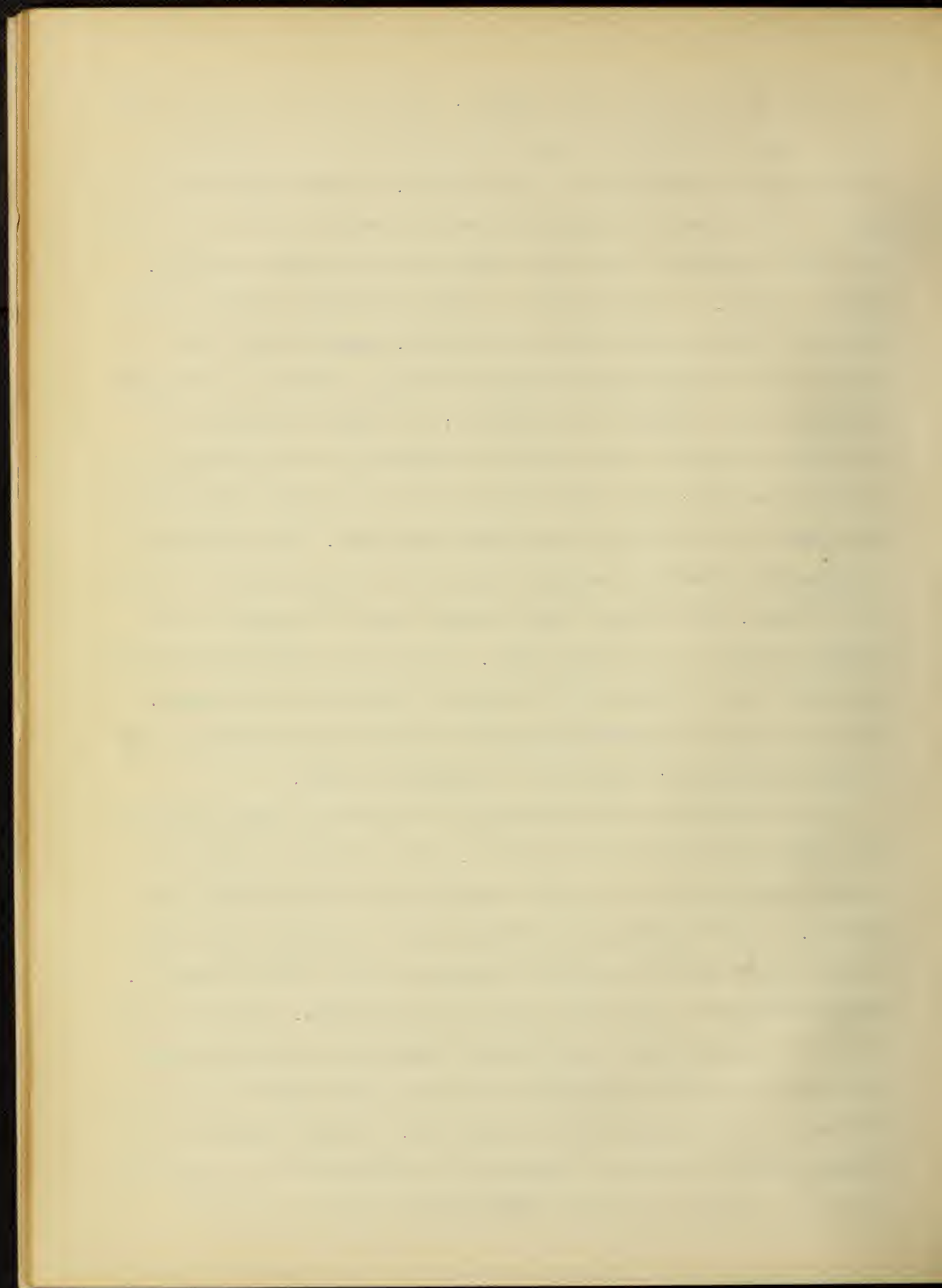
35- Historical.

History has preserved for us the memory of the famous libraries in Alexandria and Pergamos; far distant from the time when it was a mark of luxury for a rich and prominent Roman to possess a library. From the perusal of old manuscripts we can draw conclusions of the richness of the private collections which were at their disposal. The oldest library is the library of the Egyptian King Osymandus, the seat of which was at the Memnonium palace according to one authority and according to another at the Ramesium. In this city there is said to have been another library in the temple of Phta. Among the heathen the Holy Books formed the first libraries in the temples. In Persia the library of the King at Susa is mentioned. For Assyria the clay tablets with cun^eiform writing found in the ruins at Nineveh are considered a sort of library, the founding of which is ascribed to King Sardanapal (650 B. C.). With the Greeks as well as with other people the first libraries were the archives kept in the temples. Pisistratus is said to have founded the first public library at Athens (600 B. C.) which Xerxes carried to Persia and Seleucus Nikator restored. Besides the synagogue libraries there were many usually founded under the protection of a deity, the most important of which were the extensive



libraries at Alexandria and Pergam^aos; the ruins of the latter were found in good condition. Antony gave Cleopatra the library at Pergamos as a foundation of a new library. At Rome the first library seems to have been the library of Aemilius Paulus (168 B. C.) which he brought as spoils of war and which Sulla afterward enriched. Lucullus (54 B. C.) also brought to Rome as booty a library which he is said to have kept open for visitors. Augustus with the assistance of Asinius Pollio brought Caesar's plan of a library to fulfillment and founded two libraries; the Octavian in honor of his sister, Octavia in the Porticus Octaviae and the Palatine on the Palatine Hill; the latter existed until the time of Pope Gregory the Great who had the old manuscripts destroyed. The successors of Augustus, Tiberius, Vespasian and Domitian increased the libraries in Rome. The largest Roman library was the library of the Emperor Trajan in the Trajan Forum. Besides the imperial libraries there were also libraries in the largest cities of the kingdom. After the reign of Augustus, a private library was considered one of the indispensable luxuries of a prominent Roman.

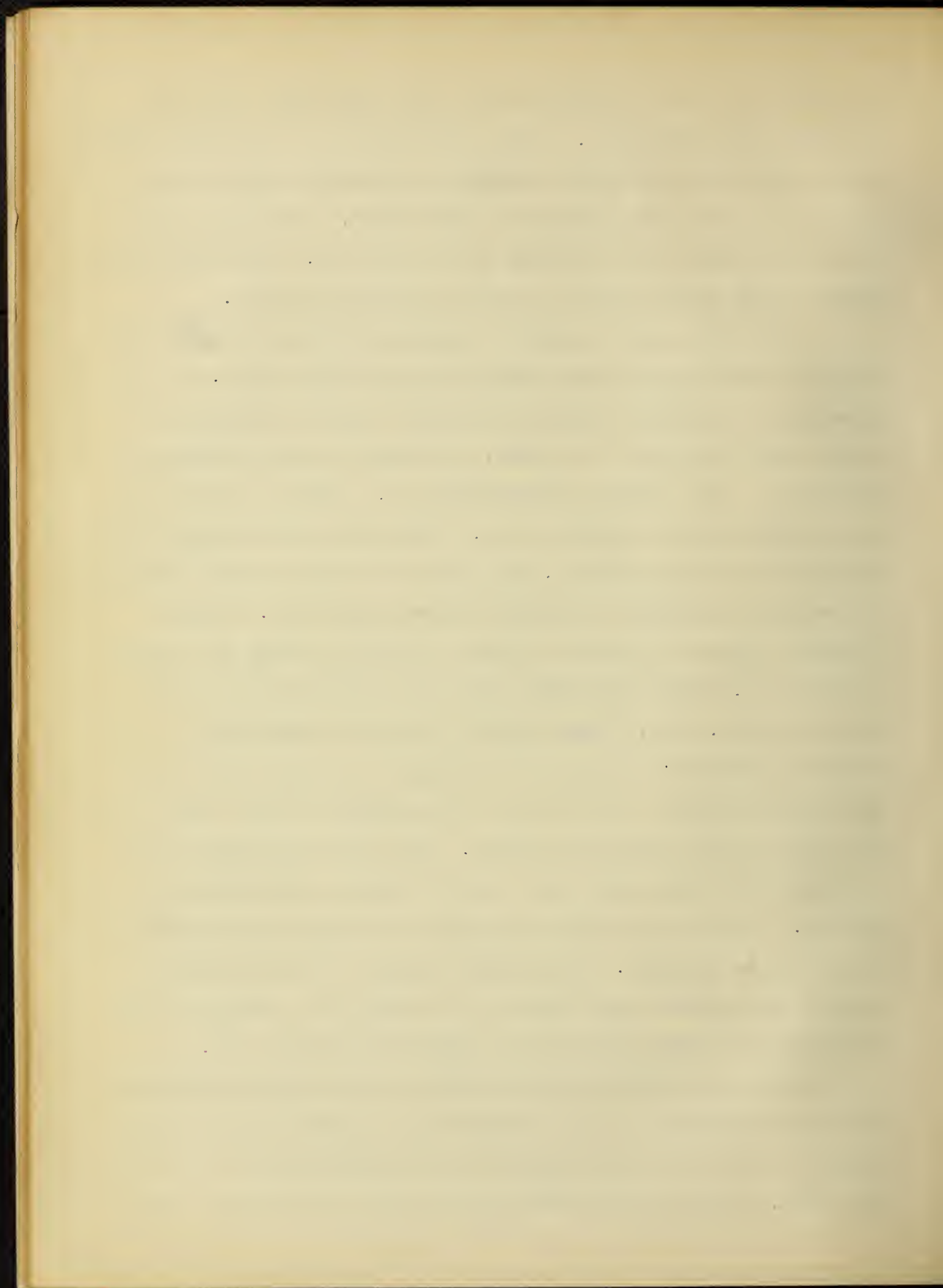
In the Christian era churches of any importance were furnished with books necessary for instruction. The churches as were the heathen temples before them were repositories for documents and records. Later a particular building near the church held these records and there was a special attendant called "bibliothecari". Besides documents, books were kept in the churches. From the sixth century on, monasteries were the most important collecting places and repositories for manuscripts, yet only a very small part of all this collection has come down to our time. A great number of the manuscripts which were not destroyed by plundering or by time were destroyed through ignorance or through the barbaric religious



conditions for often parchments were erased and used again for recording Holy Scriptures. After the downfall of the Western Roman Empire Constantine founded a library at Byzantium which was destroyed by Julian and Theodosius the younger. During the migration of the people many precious books were lost. Later the Moham-
medan princes gained general esteem by collecting books.

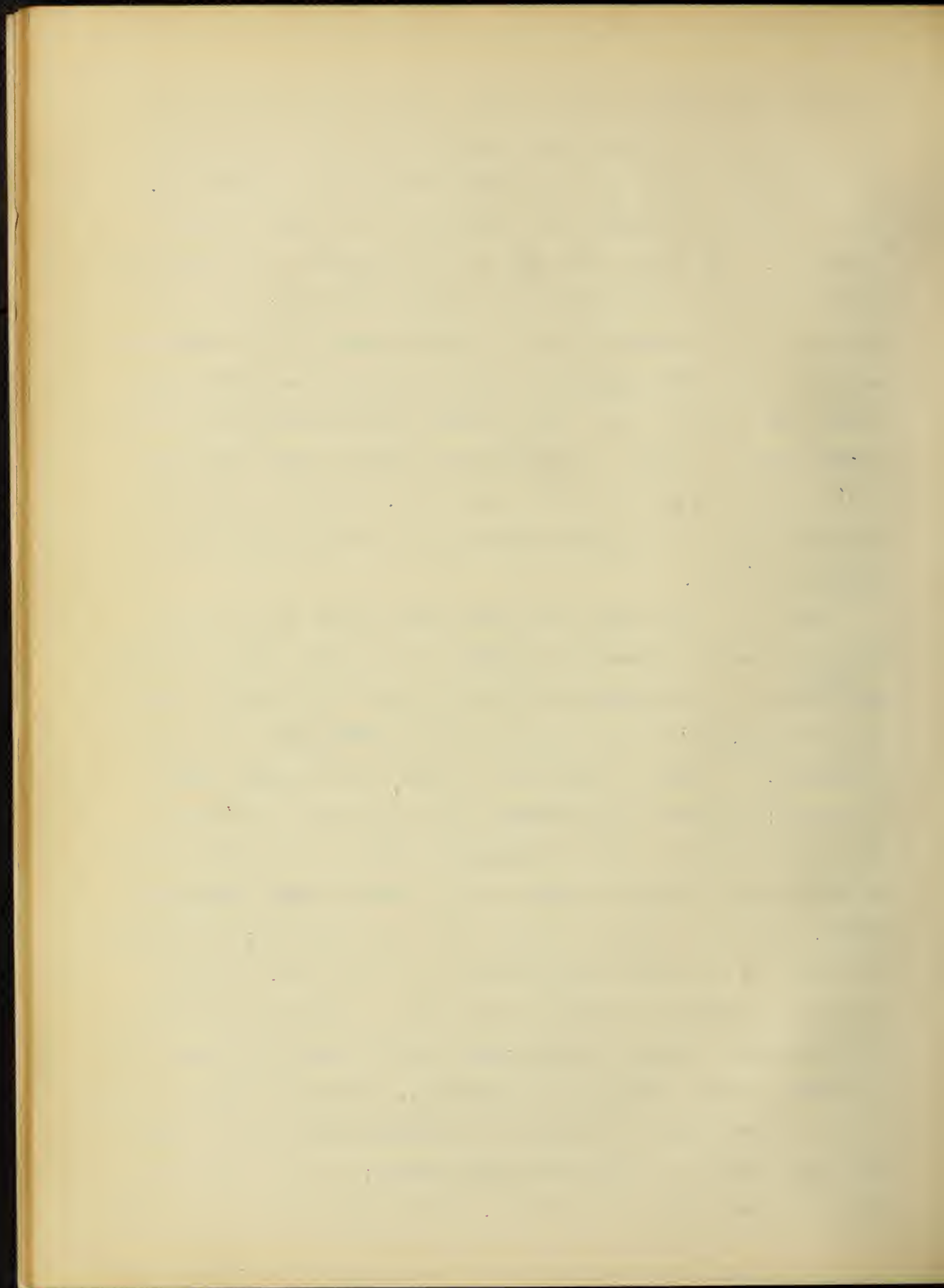
In the middle ages the monks, especially the Benedictine order, procured libraries by making bulky copies of manuscripts. By these monks were founded the libraries at Monte Cassino, Fleury on the Loire, Cluny and Corbie in France, in England those at Cambridge, Canterbury, York, Durham, Peterborough etc. Secular princes also made collections of precious books. Charlemagne established libraries in the monastic schools. Rich monasteries arose with libraries at Hessfeld, Regensburg, Reichenau, Corvey and Fulda. Alcuin founded a library at Tours; in Paris a similar library was established at St. Germain des Près; the most important one of that time was at St. Gall. These secular libraries, especially since the fourteenth century, led finally to the erection of the true public library, but in Italy this movement did not begin until the middle of the fifteenth century. From the fourteenth century university libraries arose like those in Prague, Heidelberg and Leipzig. In Italy the Medeci collected and founded the Lavrentiana biblioteca at Florence. In Rome the library of the Vatican was founded by Nicholas V and Sixtus V, in Hungary the famous Corvina by Matthias Corvinus, in Milan the Ambrosian library, etc.

With the invention of printing began a new epoch for libraries, for from this moment on, the formation of a library was no longer attended with so much difficulty or such great expense as in former times. By the suppression of the various monasteries, their



libraries fell either to the cities, churches and sovereigns or the institutions for classical learning which had the treasures thus obtained shelved and classified for the use of every one. Apart from this, followed the establishment of royal and city libraries. The Thirty Years War and the Napoleonic robberies had grievously injured the German and Italian libraries; but, nevertheless, in the eighteenth and in the beginning of the nineteenth century there arose important libraries, as the one at Göttingen (1737) and at Bonn (1818). Some German cities as early as the sixteenth century founded city libraries (Hamburg 1529) which with slight exception did not prove long lived. Ramsay's circulating libraries later on furnished the citizen with cheap desirable reading material.

During the years 1848 - 49 there began along this line the great reformatory movement apparently at the same time in England and America. Manchester and Liverpool opened their public libraries in 1852. Thirty years afterward Great Britain had 100 public libraries. In 1890 at least forty cities had prominent public libraries; Manchester had reached the first rank, in 1890 its library registered 1,560,000 borrowers, far more than the library of the British Museum at London and the Bibliothèque nationale at Paris. In North America in 1848 Boston took the lead; the library of this city at present (1893) contains 600,000 vols. and ranks among the greatest libraries in the world. New York possesses 4 and Baltimore 3 large libraries; the smaller cities all have their libraries, which, comparatively speaking, are used as much as those of the larger cities of culture. In Germany the movement began a few years after the English-American reform; yet the results of that time left much to be desired. On the other hand Paris since

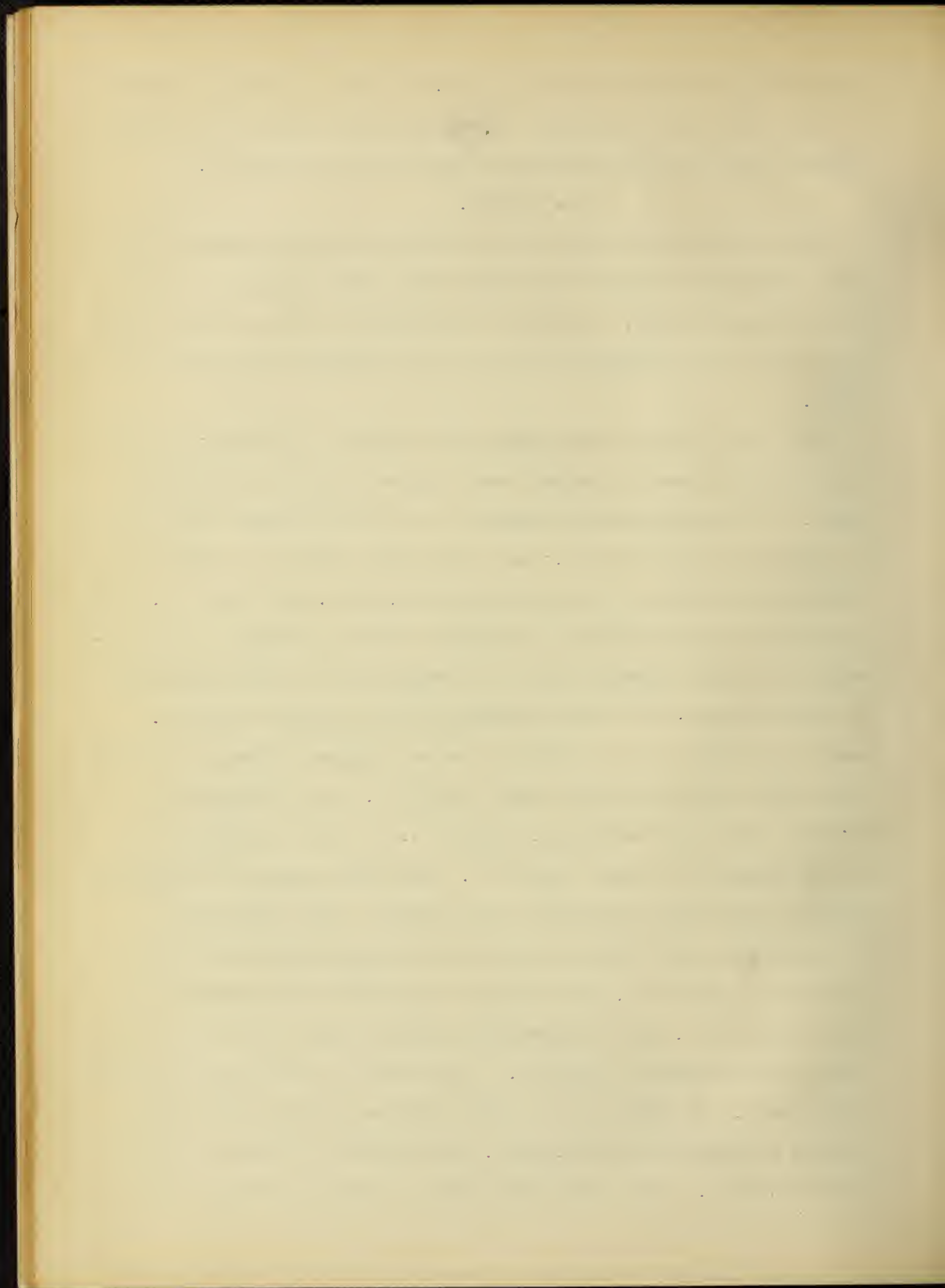


1860 has magnificent results to show. In 1890 the public library at Paris registered 2,000,000 borrowers, while the great national library just mentioned registered only 500,000 borrowers.

36- Extent.

The Mediterranean countries in former times possessed libraries with many thousand manuscripts which were of especial value to the learned class. Christian civilization as far as the amount and value of the treasured materials was concerned was far behind these.

With the printing press came a new era for libraries; notwithstanding which most libraries were limited according to present ideas. In the seventeenth century the middle European states had no library of 100,000 vols.; only the Court library at Vienna and the Mazarin library at Paris numbered 80,000 v. and 40,000 v. respectively (about 1660) The nineteenth century brought to this domain an enormous impetus and it is remarkable that the nucleus of this movement was always pressing farther toward the West. About the middle of the thirties the two largest libraries of that time (Paris and Munich) had each 500,000 v.; the libraries at Vienna, Berlin and Göttingen, 250,000 v. and the library of the British museum at London 200,000 v. The most important library of America (Cambridge) possesses at the present time (1891) 70,000 v. At the present time (1891) the Bibliothèque nationale at Paris has about 2,000,000 v., the library of the British museum at London, 1,700,000 v. and the American libraries come next in the great rank of our foremost libraries. The library at Washington contains 1,000,000 v., it ranks in the same class as the Court and state library at Munich with 900,000 v. and the Royal library at Berlin with 800,000 v. Then follow the Public library at Boston with



600,000 v. the Court library at Vienna with 500,000 v. and the University library at Göttingen with 440,000 v. The movement of the American public library system shows a notable advance. The extent of the Boston public library has already been mentioned. The 4 New York libraries number 500,000 v. and the 3 Baltimore libraries, 240,000 v. In Chicago Poole's library is just beginning the erection of a new building which will have a capacity of 1,000,000 v.

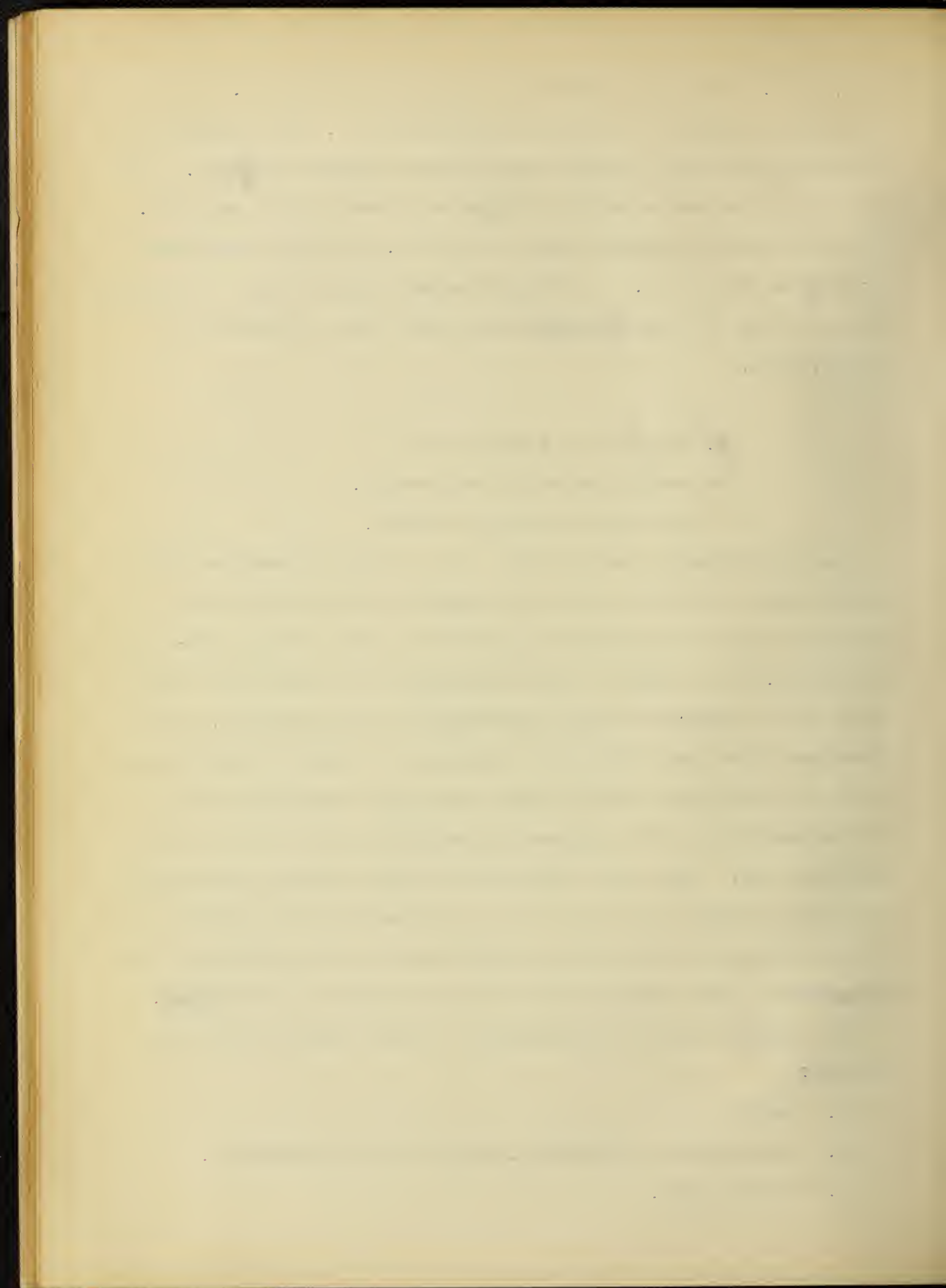
b. The plan as a whole and
the requisites of the collection.

37- Object of the collection.

In the eighteenth century they began to free themselves from their narrow ideas and from their pedantic egotism which was brought about by prejudice along certain lines and by a one-sided knowledge. They recognized that contrary to the cherished teachings of the learned colleges, universities and academies, libraries must have their value and importance as public institutions, that in a universal way they must serve as a repository for the historical part of the progress of mankind in relation to knowledge and art. The collections which should possess the greatest possible richness and completeness combined with the greatest real worth must afford the greatest usefulness for the present as well as preserve most carefully the artistic instincts of the race.

The collections of a large public library comprise the following;

1. Books
2. Newspapers, periodicals, hand-bills and pamphlets.
3. Manuscripts.

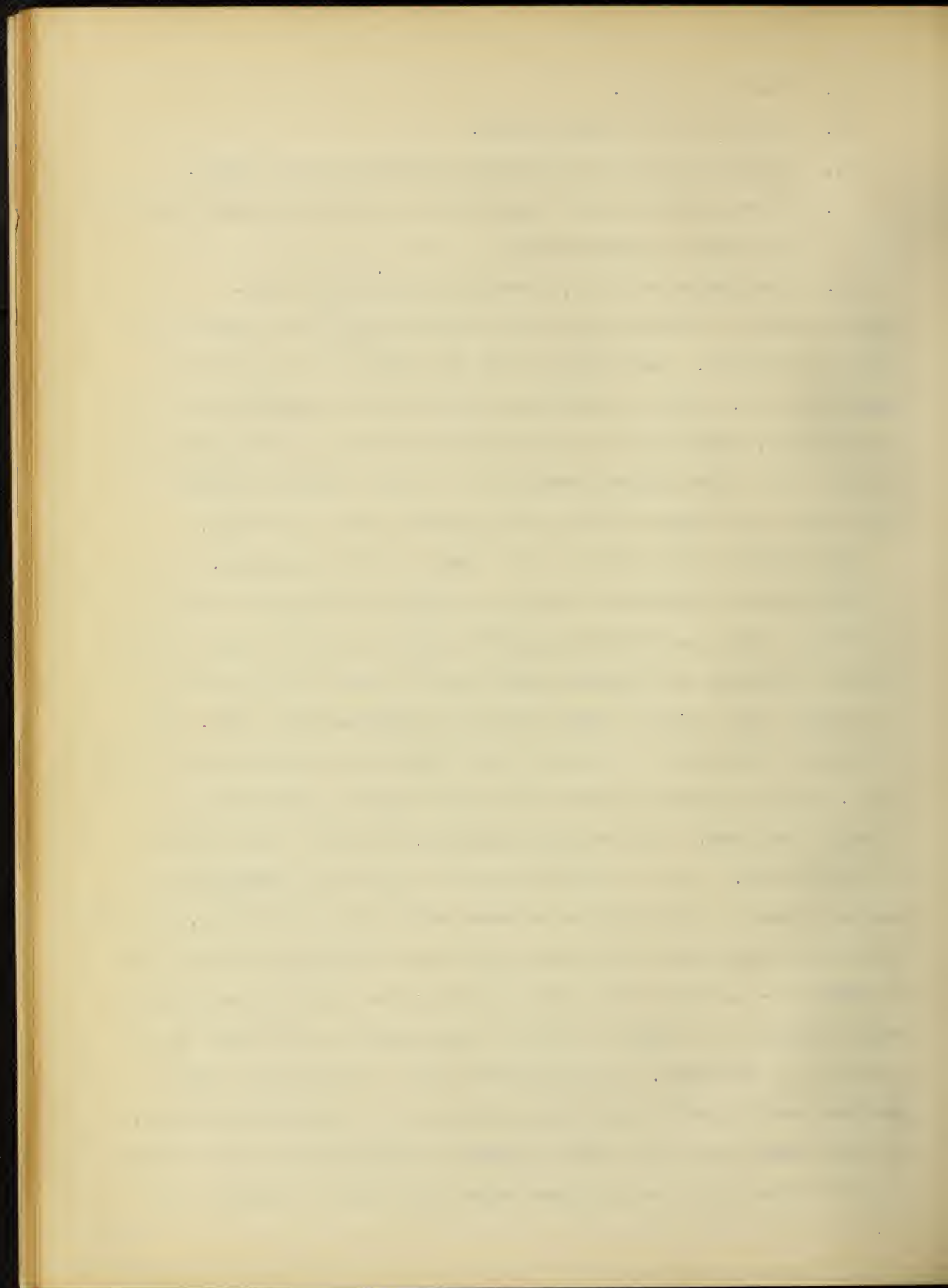


4. Music and maps.
5. Engravings and photographs.
6. Manuscript rare or artistic printing or rare books.
7. First edition after the invention of printing ie incunabula .
To that is usually added
8. Duplicates which are usually intended for loan.

Most university libraries show the same extent in the condition of their collections. The libraries of the technical high schools, academies, etc., and the libraries connected with museums and other institutions, especially art institutes lack many of the foregoing classes, since they follow according to their individual aims. In public and free libraries they are naturally more one-sided.

38- Special buildings or additions to other buildings.

For the most important "Staats und Ländes" libraries, as well as for the larger university libraries, especially in recent times, special buildings are erected which have no other aim to serve or in extreme case contain other rooms in an unimportant way. Many university libraries (the greatest at Vienna) are united with college halls. This is generally the case with libraries which belong to museums, archives, technical high schools, academies and special art institutes. For the free and public libraries of England and America separate buildings are erected with this special aim. For the German city libraries, as a rule, particular buildings like the one at Frankfurt- a- Maine are seldom erected; the collections are generally housed in a suitable part of the council or city hall or in another city building. In many cases state libraries and state archives are housed in the same building as at Munich and Hanover. In still other cases the state library is united in the same building with other state collections especially with the museum, from



which originated the expression, united collections (Vereinigten Sammlungen) as at Karlsruhe and Grenoble, the library of the British museum at London etc. (under B. chap. 8. this kind of a library will be discussed.) Often in England and America other public collections are joined to the libraries. In Marseilles the public library is in the same building with the art school. (École des beaux arts et bibliotheque)

39- Requisites of the collection

The requisite rooms in a library are of three essential kinds,

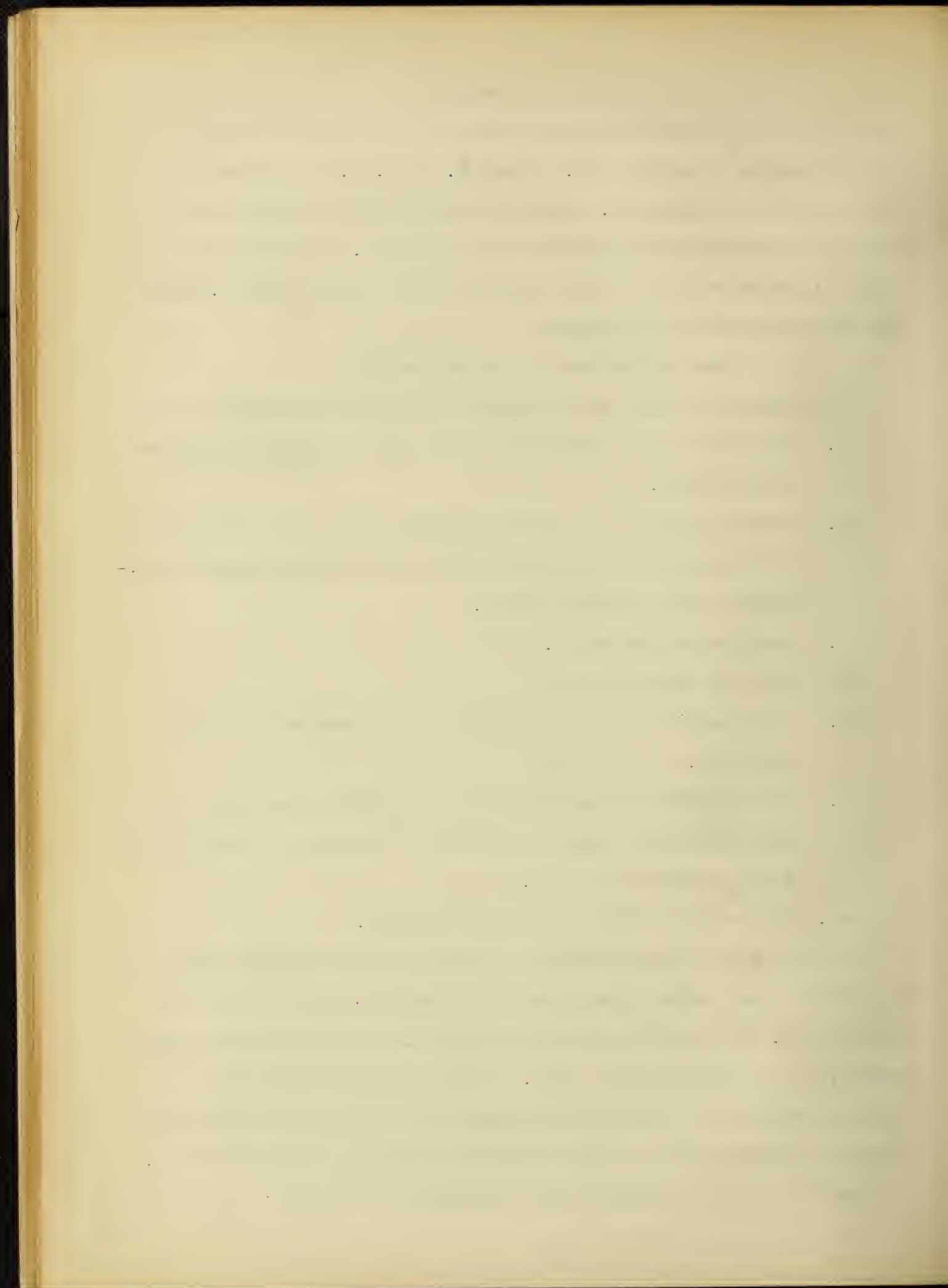
1. Rooms in which books and other collections are shelved-stack rooms.
2. Rooms in which is granted to the public the possibility to study books, to borrow them or to examine engravings,- Reading and delivery rooms.
3. Administration rooms.

To these are usually added

4. Some servants rooms for the janitor, porter and other servants.
5. In many English and American are further provided a large auditorium for public addresses, a room for an art collection, a music room etc.

40. The way in which the library is used.

Whether all of the aforesaid rooms are to be brought under one roof and to what extent they shall be provided depends upon the kind of use, often on the local conditions, on the business organization, on the destined use, etc. There are many libraries which only pay regard to transactions within the library building where they have none at all or only a limited loaning of books outside. In others there is a regular loan system for outsiders; in this case

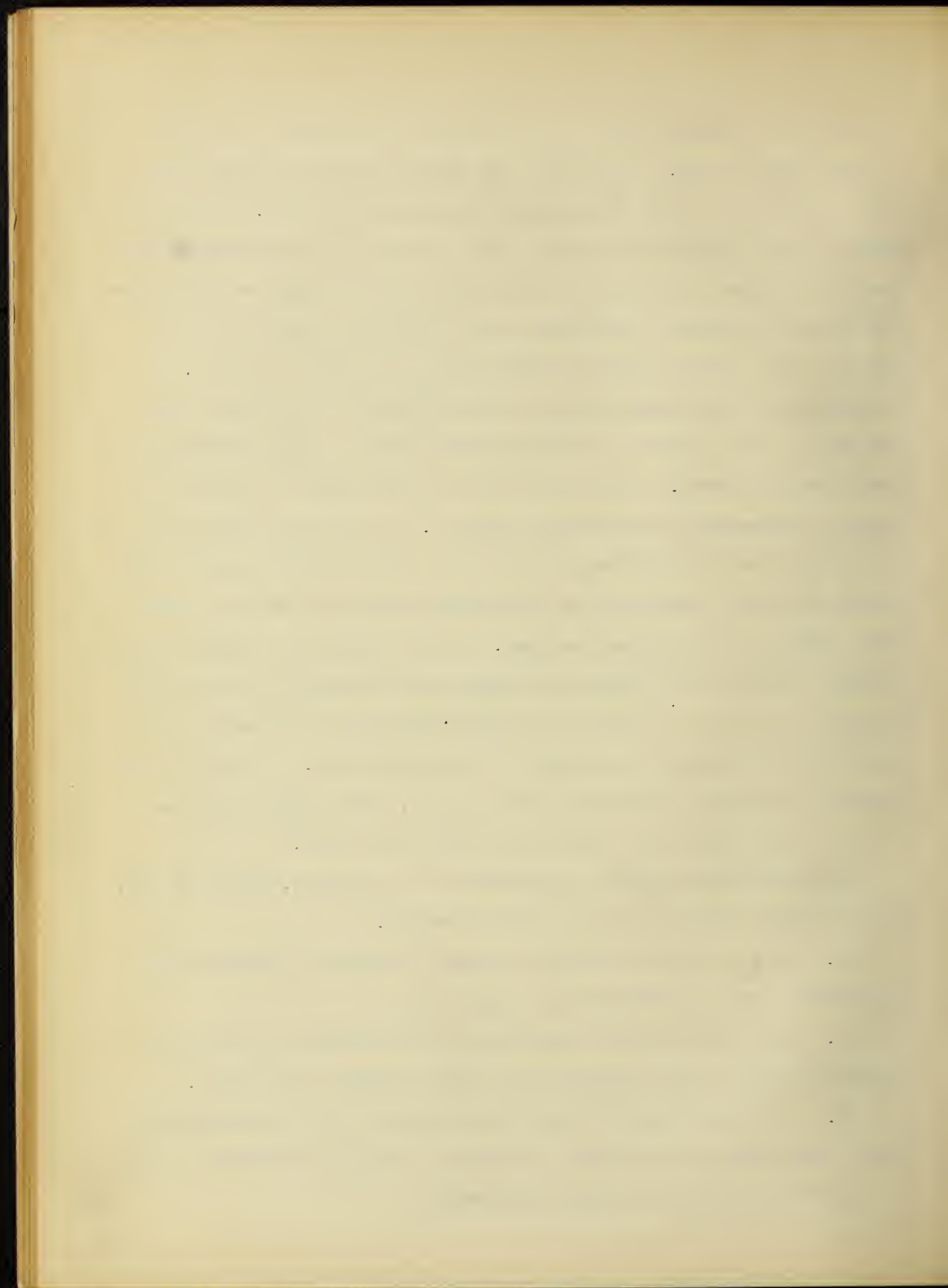


a loan desk is to be provided besides the reading room while in the first case intercourse with the public is limited to the use of the reading room. The latter are found in most English libraries as well as in the Bibliothèque nationale at Paris. The arrangement of the large reading room in the library of Ste Genevieve and the Bibliothèque nationale at Paris and in the library of the British Museum at London, the former with a seating capacity of 420 and the other two with 344 and 364 seats is a natural result. In a similar way, yet based on other conditions, the numerous large and small city libraries of North America show a large attendance in their reading rooms. The same is true of the public libraries in France, Switzerland, Belgium and England. This great difference is to be found among libraries, that on the one hand and in most cases stacks are only accessible to the library staff and on the other hand, there are exceptions to that. In the German and Austrian university libraries the regulation exists that access to the shelves as well as the use of books on the open shelves be allowed to students of the university and also to other scholars. A similar regulation is found in technical high schools, many academies etc.

41- Conditions relating to the whole plan.

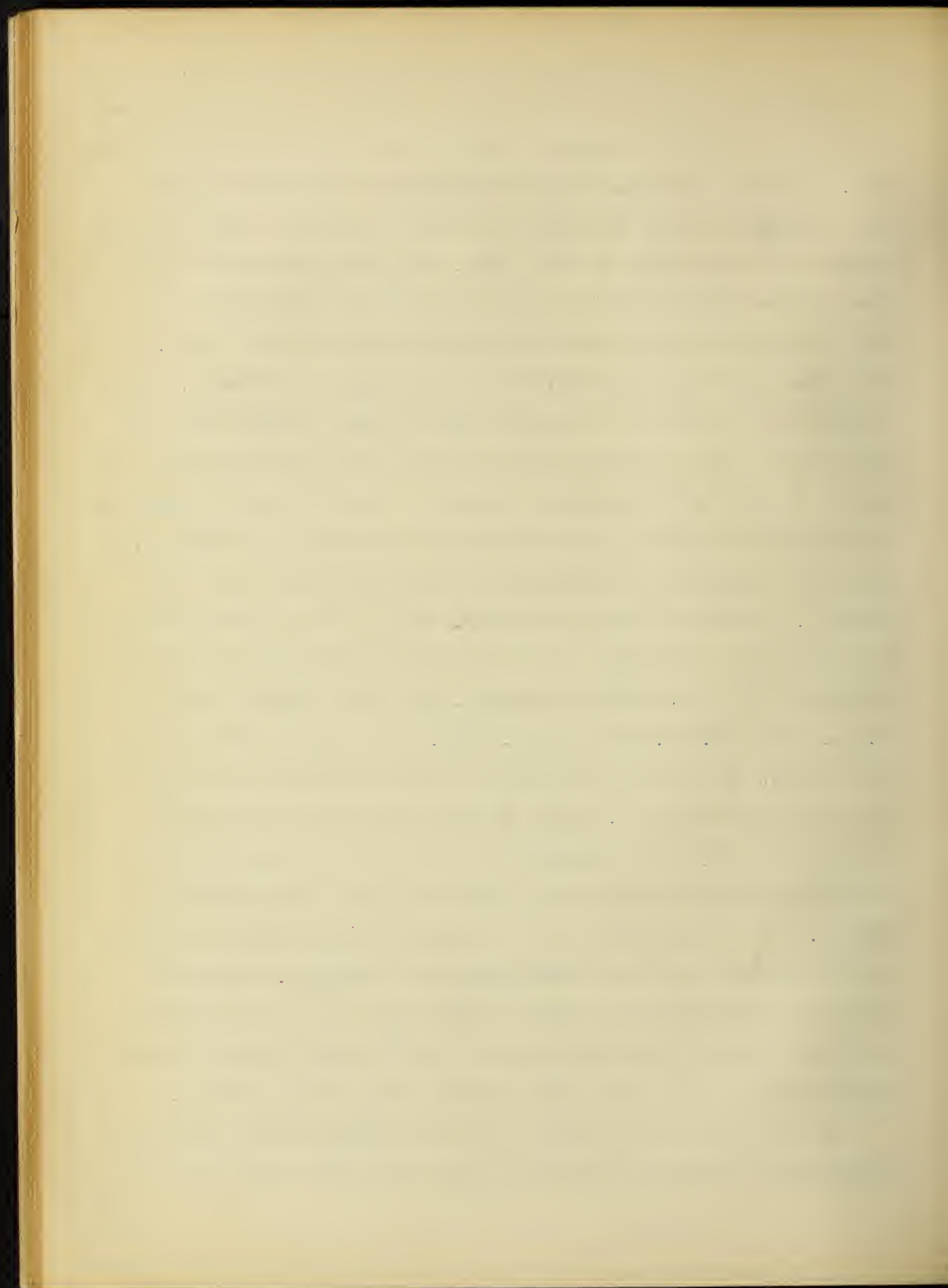
In the entire plan and arrangement of a library, first of all, the following three conditions are essential.

1. For the pattern of the library, roominess, comfort and expediency must be provided on a large scale.
2. The collection of books must be protected in an almost perfect way from fire, dampness and other harmful influences.
3. A large enough lot must be selected and the plan drawn in such a way that in the future if extension becomes necessary it may be done without any particular difficulty.



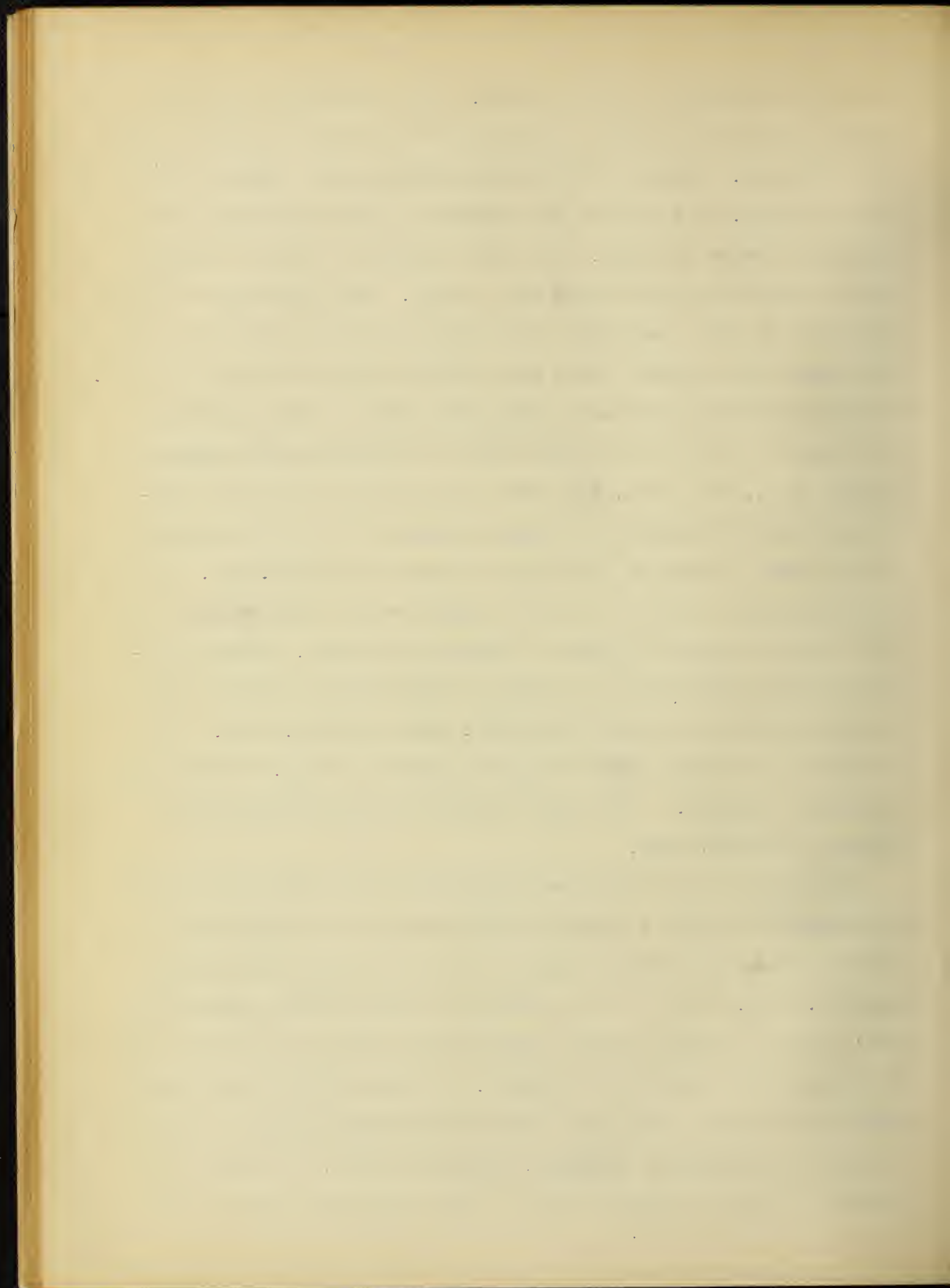
Recently attempts have been made to fulfill the foregoing conditions by a suitable arrangement of the plan and manner of construction. In early centuries, library buildings, in so far as such buildings were erected especially with that intention, were built as representative edifices or show plans. They were generally erected like palaces and contained a number of large architectonic halls, along the walls of which were placed high stacks or book cases. In this class may be put the Biblioteca Laurenziana at Florence, begun in 1524 after the plans of Michael Angelo, whose entrance hall was built by the great artist and whose stairway was completed in 1571 by Vasari, as well as the Libreria vecchia at Venice, built by Sansovino in 1536, one of the most splendid secular buildings in Italy (fig. 44). Later the library of the Vatican (Biblioteca Vaticana) which Pope Sixtus V. in 1588 had built by Fontana will be fully discussed (fig. 45 & 46). These buildings which Pius IX had magnificently restored, traversed the large court of Bramanti. The large library hall is 70.8 m. long, 15.6 m. wide and 9 m. high. The vaulted roof rests on six pillars. On the walls are frescoes which portray the history of the papacy and knowledge. Along the walls and around the pillars are low cases in which manuscripts are preserved; in the center of the hall are placed magnificent gifts to the pope and the Vatican library. To the right and left of this hall extend spacious galleries and corridors in which manuscripts are also kept. The famous library of Oxford built in 1597 by Bodley and called the Bodleiana is to be given due consideration, this was enlarged during the years 1634-40, so that the ground plan has the form of the letter H.

As has already been stated, with few exceptions the books were placed along the walls in cases or high stacks, the upper part of



which was accessible only by ladders. Later projecting galleries extended around the stacks to render less difficult access to the upper portions. As one of the oldest examples of a library with a gallery in fig. 47 a part of the interior of the extension of the Bodleiana library is given. In these libraries a special reading room for the use of the public was lacking. The collection of books multiplied in such a way that the stacks on the walls were no longer sufficient and low floor cases were placed in the middle of the hall. This was especially noticeable among the later library buildings, the library in the old electoral palace at Mannheim, the monastic library at St. Gall (fig. 49) which was in one of the early Benedictine monasteries (now the Catholic seminary and royal academy) and the court library in the royal residence at Vienna. (fig. 48) The latter building occupies the entire south-western side of the Josefplatz and was erected in 1722 by Fischer van Enlach. Broad stairways on whose expansive walls Roman antiquities are placed, leads to the splendidly decorated hall 78 m. long and 17 m. wide. In the center of the hall are the marble statues of Chas. VI and other Hapsburgian princes. The large vaulted buildings covered with frescoes by Daniel Grau.

The plan of the library built in 1706-23 by Duke Anton Ulrich at Wolfenbüttel shows a peculiar and remarkable arrangement in which the idea of a central building with light from above first appeared. (figs. 50-51) In the centre of this building according to Korb's plan is an oval rotunda supported by twelve pillars and above it a turret with twenty four windows. On the south is a hall with comfortable stairs, and on the four corners are pentagonal rooms for the administration, catalogs, manuscripts etc. The idea of a central building is carried out in a more extensive manner by the

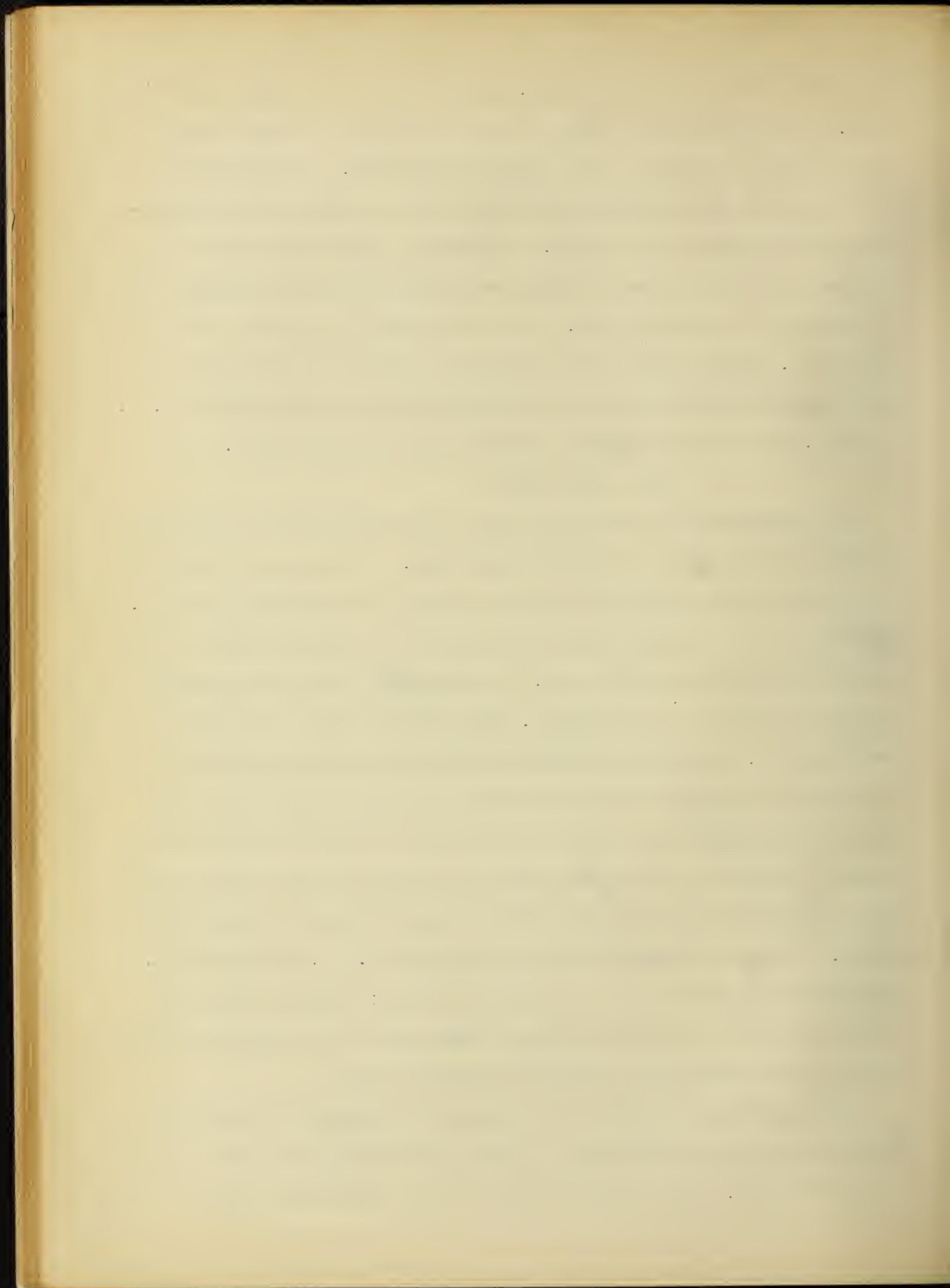


Radcliffe library at Oxford (fig. 52-53) built in the year 1740 by Gibbs. In both of these buildings the arrangement of book stacks along the wall in fairly high tiers is retained. In consequence of this, as in the libraries already spoken of, only small proportions of the space can be used. A somewhat better organized plan is shown by the old ducal library erected in 1765 at Karlsruhe which is divided by a passage (fig. 54) in the form of a cross into four main rooms. These rooms are separated by partitions which run at right angles to the length of the building into narrow rooms; A. B. C. and D. are assigned to the preservation of manuscripts.

43- Late plans.

The practice of placing the cases along the walls of the book room was maintained for a rather long time. It was to be found in the Royal library at Berlin erected by Unger and Boumann, 1774-80. According to the original plan this had in the entire extent of the building one book room, 81 x 17.5 m. reaching through both upper stories and divided by a gallery. The public library at Amiens (50- 60,000 v.) built by Cheuffey in 1824 also merely possessed stacks with galleries on both the walls of the library which was lighted from above and in just the same way in the Court and state library planned by von Gartner during the years 1832-43, the books were shelved along the walls, always in connection with the ladder system. By the arrangement of a low gallery 2.2 m. high the 8 m. high book room was divided into three stories; reading rooms, as well as delivery and administration rooms were to be found connected with the stor rooms in a rather inconvenient way.

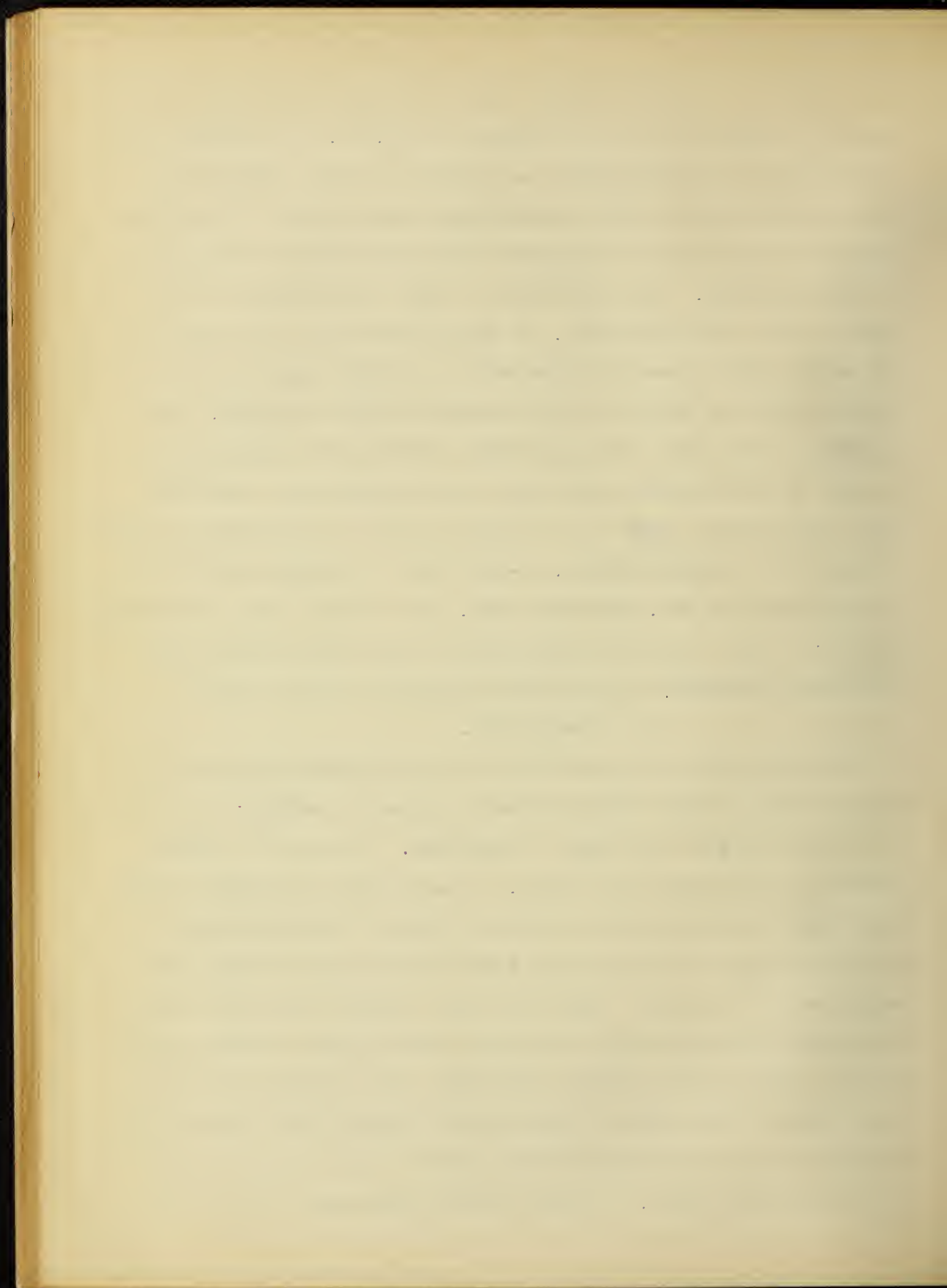
It is plainly sure that the space in a library will not be used to a very great advantage if the stacks are only placed around the outer walls. Della Tanta seems to have taken this point of view



in the plan for a public library which he added to his works which appeared in 1816 and this is repeated in fig. 59. As is easily seen the collection of books was to be shelved in a long narrow row of alcoves around whose walls the book cases were placed. It is very evident that by such an arrangement oversight over the collection of books was lost. This oversight can only be maintained by the erection of a large book hall. A better way to use the space is to put double cases across the book hall at a right angle to the longitudinal walls and to make these accessible from both sides. The book cases then appear like partitions dividing the hall and the smaller the space between them the more advantageously the floor space can be used. Such an arrangement exists in the Imperial public library at St. Petersburg (fig. 60-61) built by Sotokof in 1795 and in the library of Ste. Genevieve (fig. 62) at Paris built by Labrousse 1843-50; in the latter the upper part of the stacks which reach from floor to ceiling is accessible by use of sliding ladders.

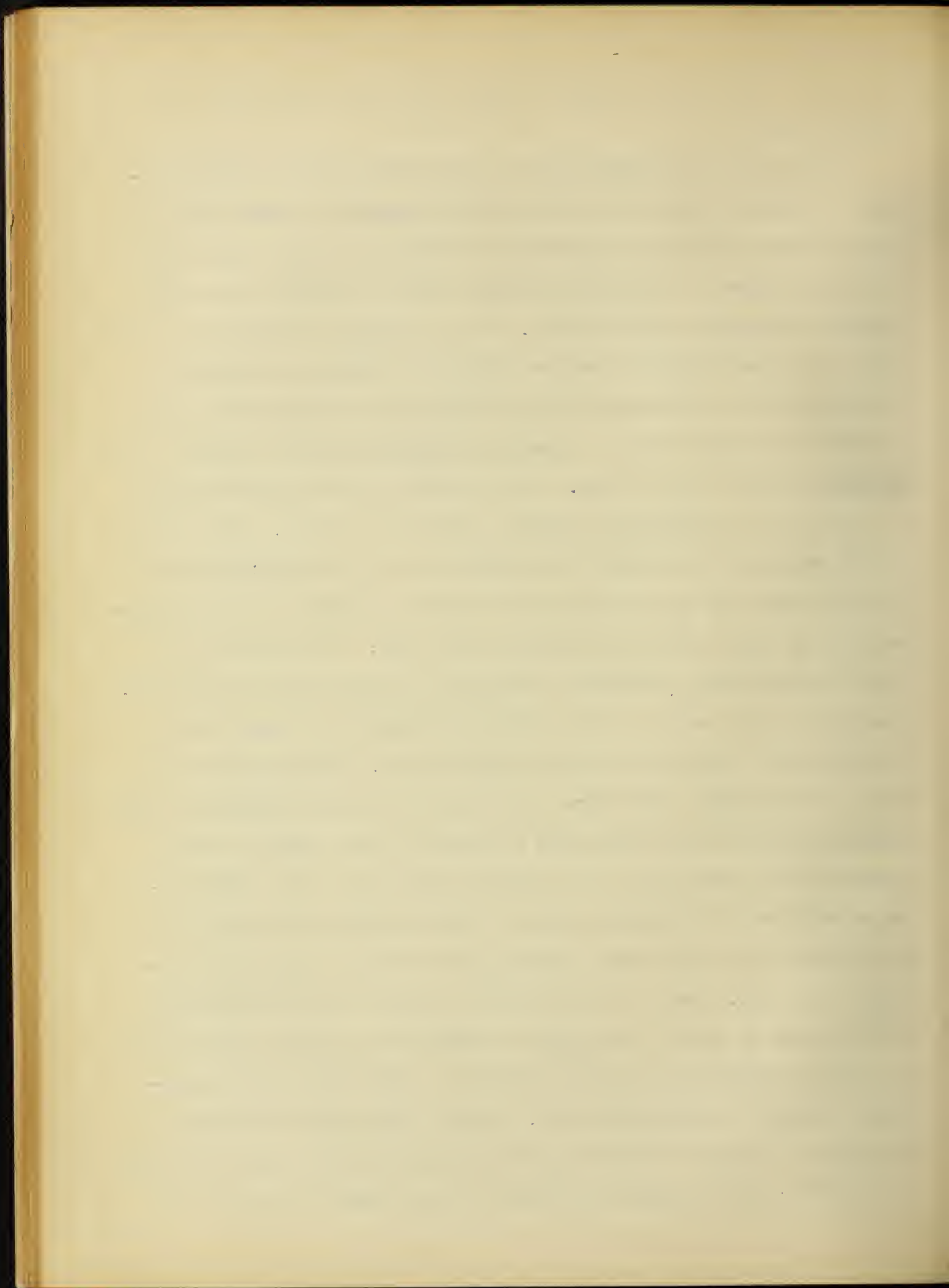
44- Modern plans.

This plan and others carried out on the same principles still show one fault, they generally demand the use of ladders; the latter is not only awkward but might be dangerous. To avoid the ladder system, as has already been shown, galleries must be erected around the stacks and these should be built at such a height from the ground floor that one can easily reach the top shelf without the assistance of a ladder. They went a step farther along this line, they pushed the book stacks together leaving space to merely turn around, connected two opposite galleries with intermediate floors which reached from stack to stack and in this way built stairs whose height was so proportioned that the books on the top shelf could now be reached by hand. In this way they succeeded to an art of



shelving collections of books to which the name stack-system is usually applied.

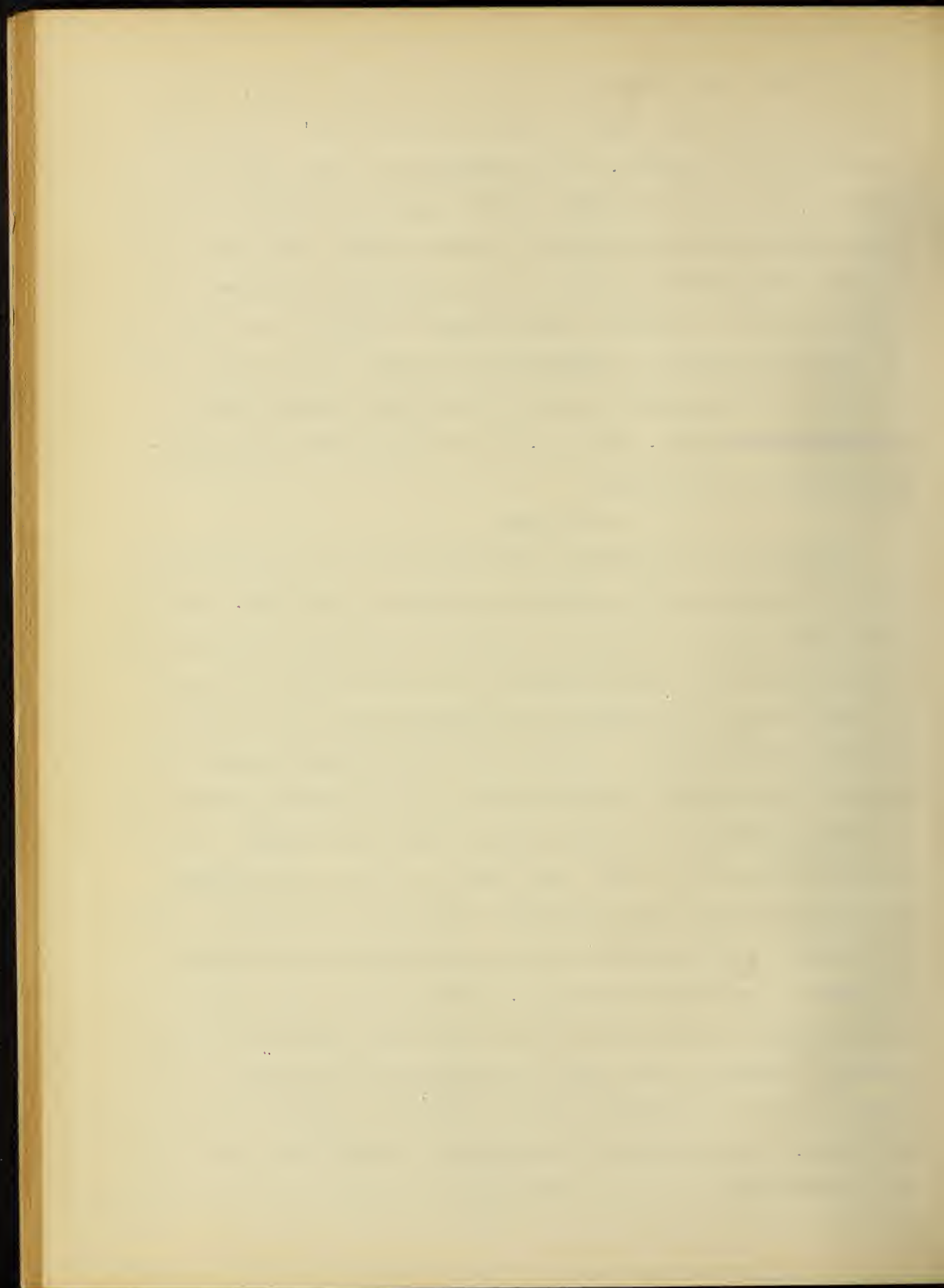
This system was fundamentally and to the greatest extent carried out in the extension of the British museum at London and soon after in the Bibliotheque nationale at Paris, and since that time the greater part of the more important recent libraries have been erected according to this system. One of the few exceptions to this plan on our continent is the new University library at Copenhagen which was built at the end of the fifties, and possesses an interior with beautiful effect. A passage runs through the center of the building through two stories. On the right and left perpendicular to that and the longitudinal walls, stacks are placed. The height of the stories is so great that ladders have to be used; this and the fact that the space between the stacks is broken by the passage-way are the greatest deficiencies of the plan. In America for a long time and until recently a different plan was put in execution. According to the manner of the old hall-libraries a single room was built for the stack room and reading room. This room had windows on both sides, from these side walls the double stacks ran perpendicularly like partitions and on each side was built a row of alcoves which opened into the central part of the hall, these alcoves were usually placed in several tiers lighted from the side. The middle of the hall was a reading room and was lighted by skylight. In figs. 64-65 the interior of a small and large building of this kind is shown. The public libraries of Boston, Cincinnati, the Boston Athenaeum, the Astor library at New York, the Congressional library at Washington etc. are all built after this plan. Recently in England and Scotland some libraries have also been built in this way; but in addition to this, in the ground floor of the



reading rooms the alcoves are filled with little tables. Fig. 66 shows the plan of the Court of Scotland solicitors' library which was arranged in this way. The disadvantages of this plan are very manifest; the use of the empty central part as a reading room causes great disturbance and discomfort to quiet study; the book stack is cut into two decidedly separate parts and is hard to oversee, it is only possible to obtain the remote books in making a long circuit; at winter the heating is difficult and costly, the warm air ascends so that it is unbearable to stay in the higher stories and the bindings become stiff. The A. L. A. meeting at Washington unanimously rejected this plan.

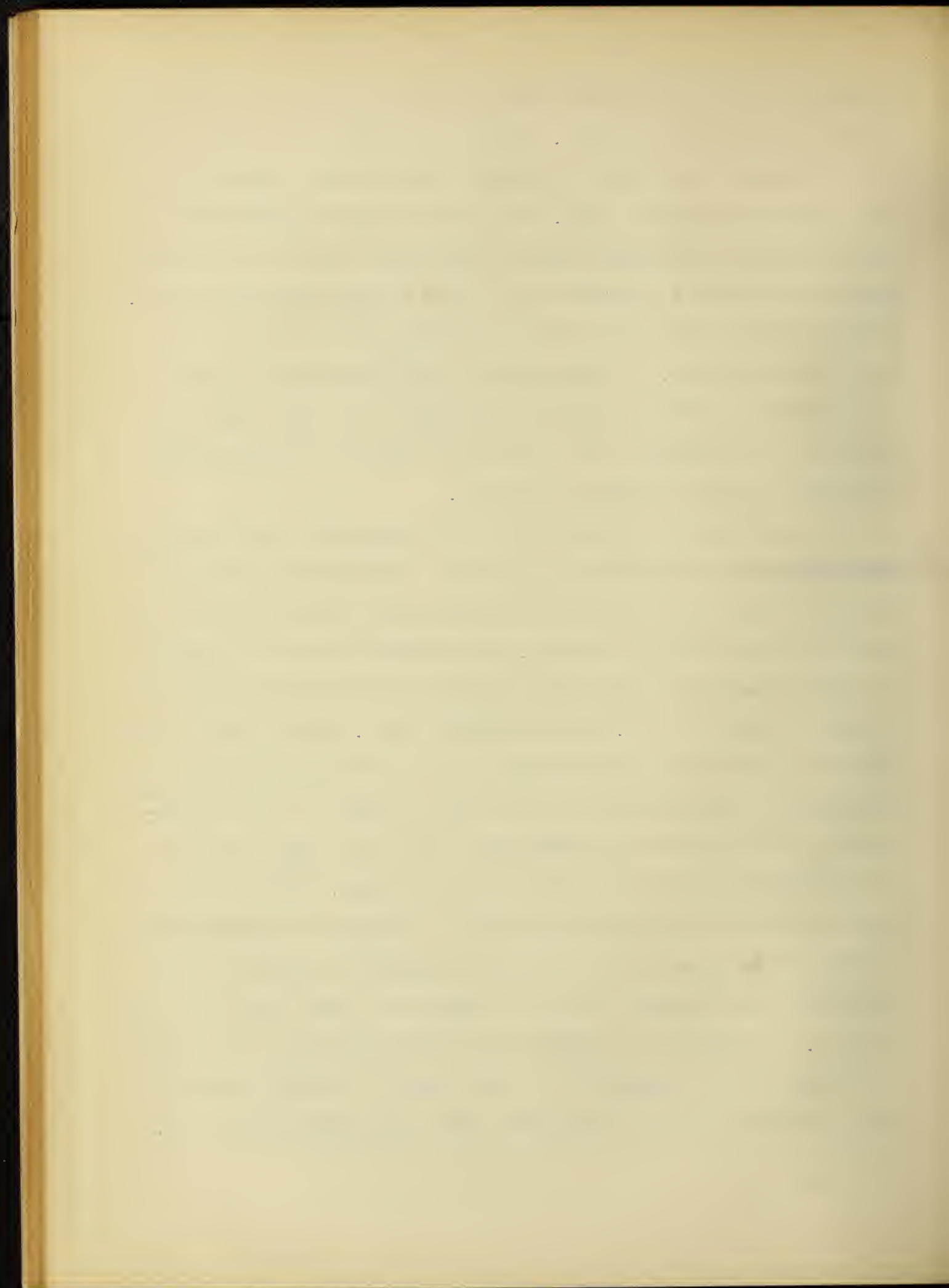
45- Site.

Whenever it is possible to guard against fire, the libraries are to be erected in an open space as detached buildings. By following such a plan the other essentials of preserving good light and ventilation for the stack rooms and the reading rooms can easily be fulfilled and the possibility of enlarging the building can be equally as well secured. In respect to the necessary precautions against fire many well arranged plans are not adequate for the conditions expressed or at least only in a very light degree. As an example in fig. 67 is shown that the lot on which Bibliothèque nationale (formerly the Bibliothèque imperiale) at Paris is situated is enclosed in four narrow streets, rue Richelieu, rue Vivienne, rue des Petits Champs and rue Colbert. Situated in a very active neighborhood whose streets are all lined with shops and stores and until recently one part of the sites now occupied by the library, at the corner of the rue Vivienne and rue Colbert was occupied by dwellings and shops. The extension of the original library which since 1724 had been located in the old Hotel Mazarin was effected by the gradual



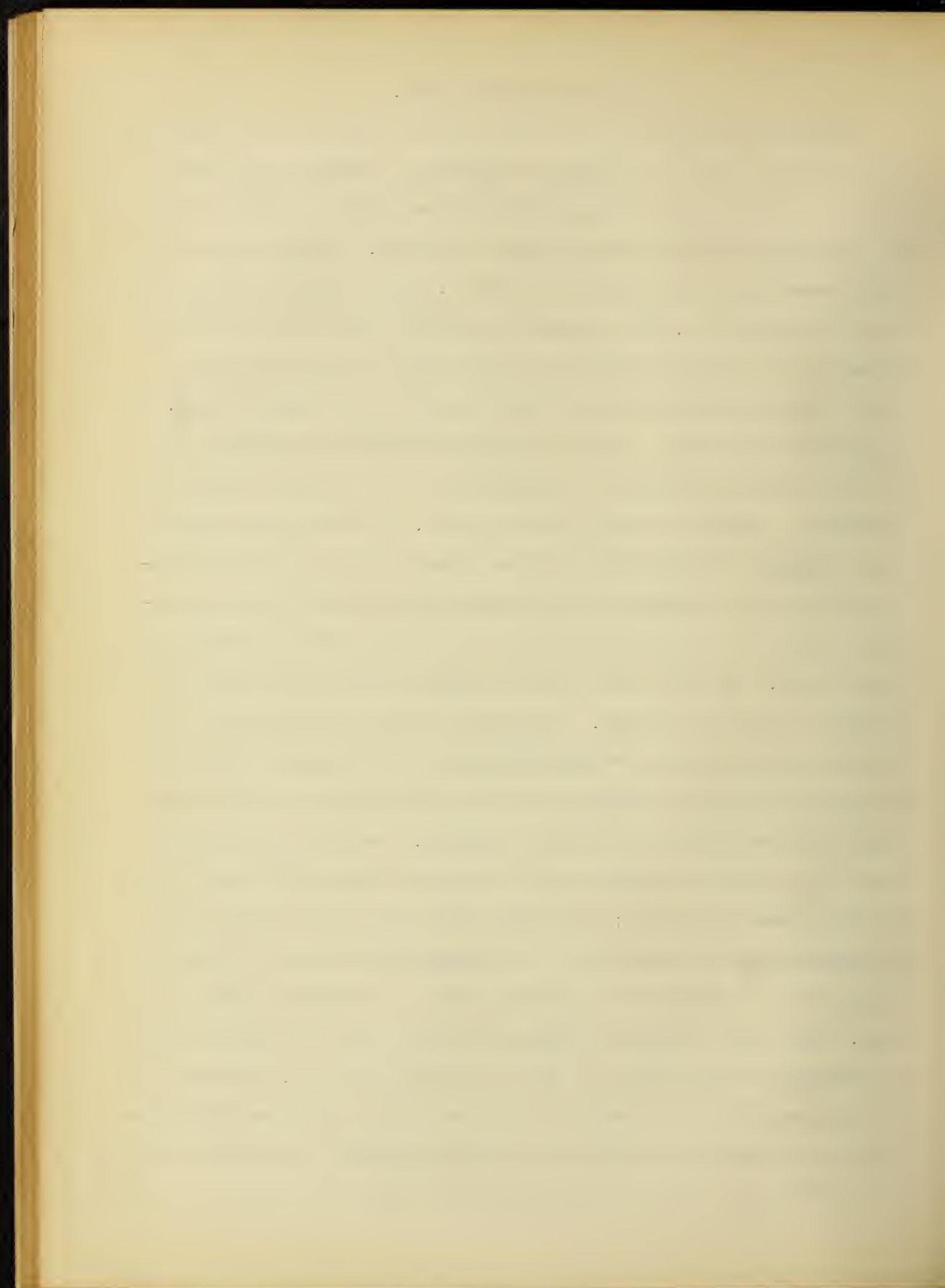
purchase of the neighboring ground and about ten years ago as was related the rest was obtained. Repeated attempts and plans without any results have been made to procure a site better situated and better protected against fire. At a time before the beginning of the extension of the Louvre and the Tuileries a plan was earnestly advocated to erect a library on the space between the two palaces. Another plan was concerned with establishing the library in the Palais du Luxembourg. If the security from fire becomes greater by the removal of the neighboring dwellings and shops, still the position of the building will only fulfill one of the conditions necessary to secure immunity from fire.

In comparing the library of the British museum many scruples arise concerning its immunity from fire. The various extensive collections which are sheltered in this great building occupy different stories above one another. The extension which was erected for library purposes in the large court of the Museum was built in a space of from 8 to 9 m. from the outer walls. Taking into consideration not only this condition but also the circumstances that the extension is lighted mostly by sky light in case of fire the protection of the library seems doubtful, since sky light will not afford adequate protection against flying brands: besides the connection of the extension to the exits is limited; for these reasons the plan which appears noteworthy and exemplary in habitable and constructive arrangements cannot be taken as a model of a fire proof building. As examples of properly detached buildings may be cited the library of Ste Genevieve at Paris, those at Munich, Stockholm, Halle, Greifswald, Kiel, Stuttgart, Göttingen, Wolfenbüttel etc.



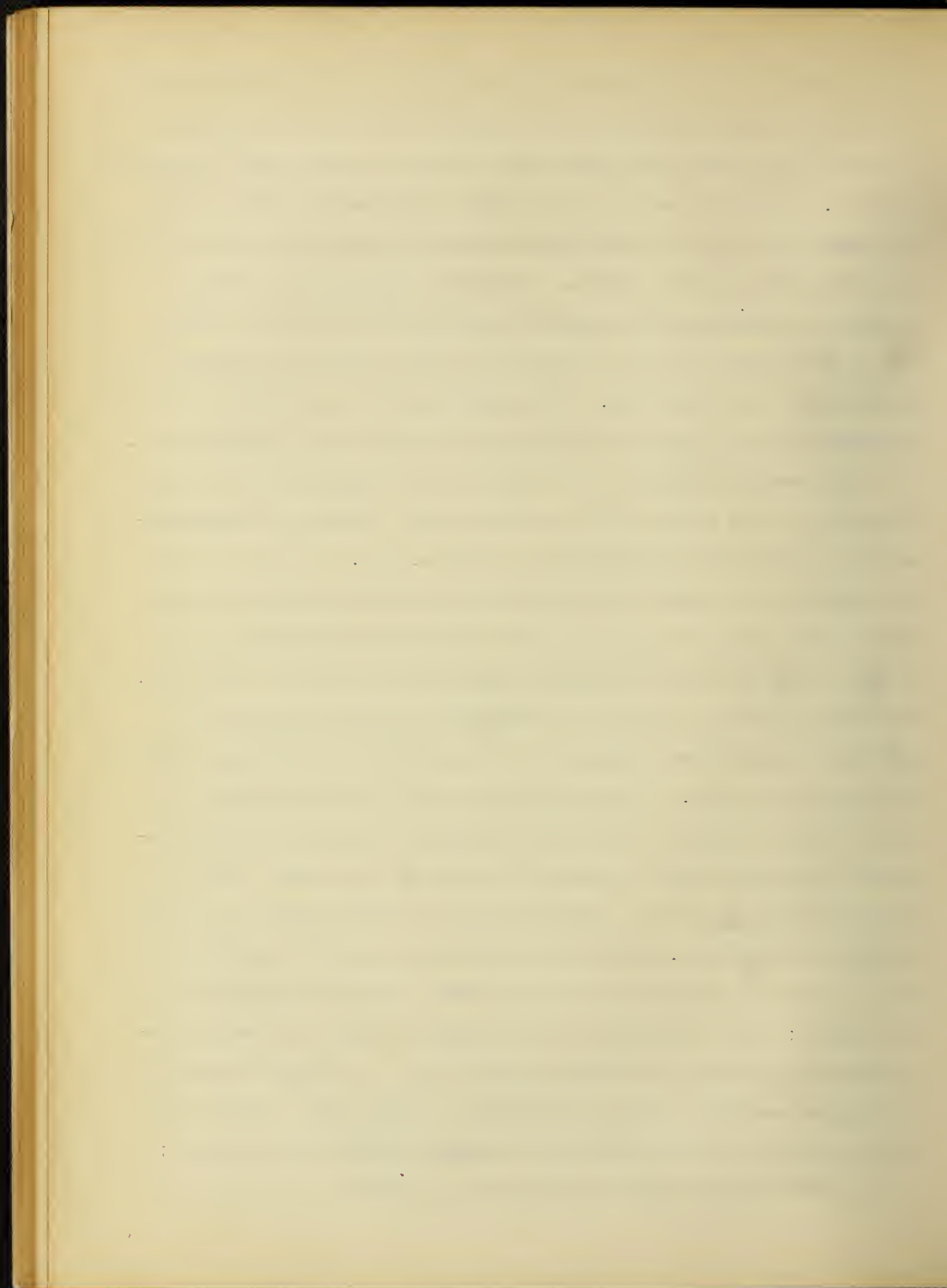
46- Ground floor plans.

The ground plan is very simple when it treats of the plan of a hall library, that is a library arranged in a single hall which is destined not only for the collection of books but is also to serve as a reading room and work room for the staff. Usually one or two store rooms are placed before this hall. As an example of this kind of a library in fig. 68 is shown the plan of the library built in 1876-78 at the Ecole de droit at Paris which is arranged with a store room and two halls which serve as book and reading rooms. For larger libraries such a plan is manifestly impracticable and for the two objects which are to be fulfilled in a library building two different groups of rooms must be built. In the ground plan of such a library building it is to be arranged that the administration room be the nucleus of the whole plan and that it be skillfully united with the book room but especially with the public delivery room. The book room and the administration room are to be separated from one another. This is not only desirable for the orderly administration of the library but for increased immunity from fire, for the two adjacent rooms can be separated from each other for heating and artificial lighting. Delivery and reading rooms are to be so arranged that the public can easily reach them, directly from the street; the cloak rooms and toilet rooms are to be placed under the entrance. The latter rooms as well as the entrance itself should be so arranged that one attendant can oversee them. More than one public entrance should only be provided when the forgoing conditions give special occasion for it. Moreover the reading and delivery rooms are to be so placed as to render unnecessary any crossing of the book room which people not attendants of the library need enter, in carrying books from the stack. As to the



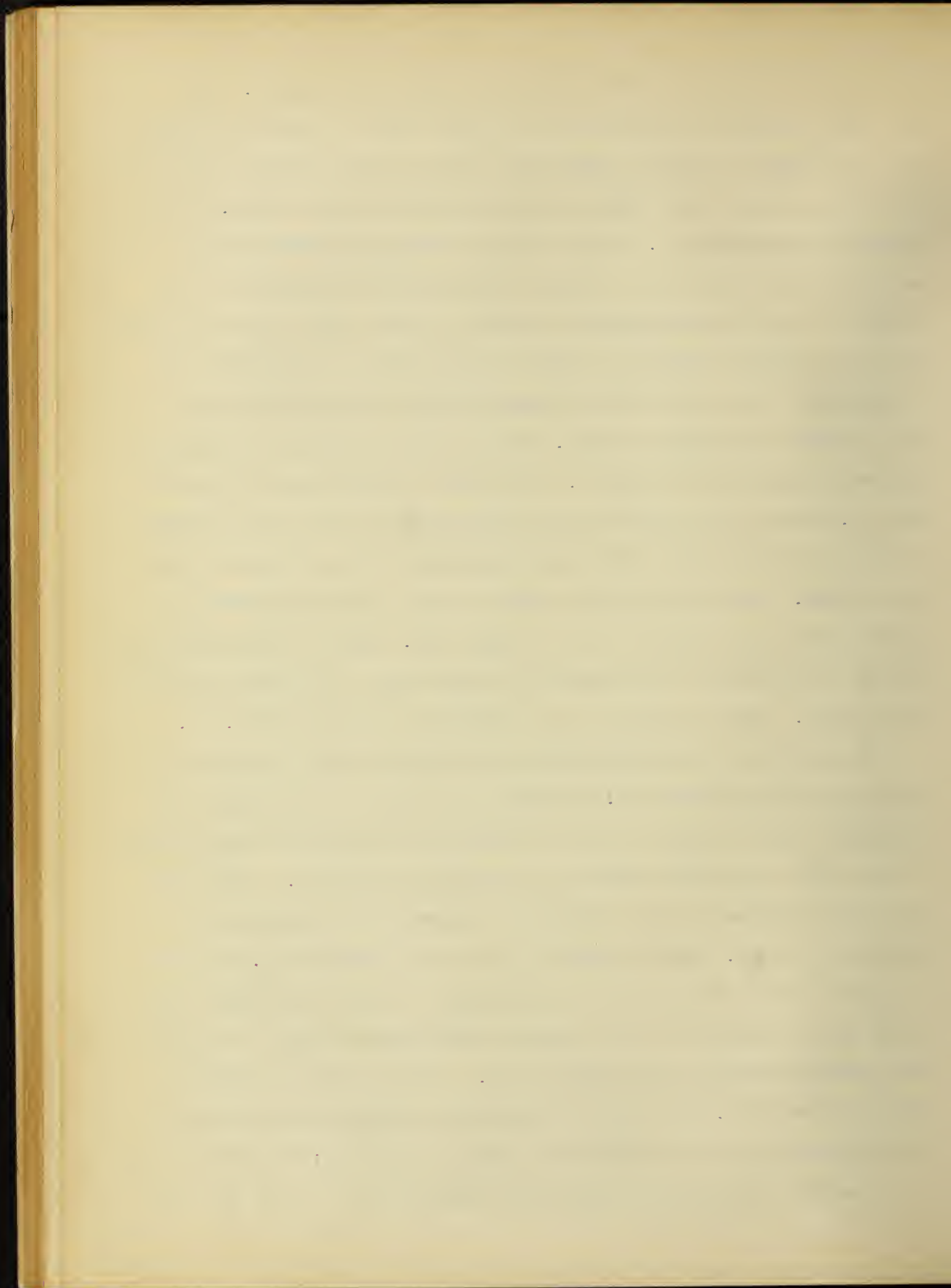
reading room it is finally to be desired that it be situated as far as possible from the noise of the street, that the stacks may be reached without any circuitous route and that service may be swiftly secured. It may be summed up from what has been said that it is best when site and available funds allow to remove the reading room and the administration room to a separate wing of the building because in construction, connection and use as well as in heating and lighting they are to be treated in a way differing fundamentally from that of the book room. With such a plan if an extension becomes necessary later, it can be easier executed than with a closed plan.

The reading room has been placed in the centre and the stacks arranged on both sides of it as in the state library at Frankfurt-a-Maine, in the Valliano library at Athens, etc. If, to be sure, the result is obtained that the books are brought in the shortest way to the reading room, on the other hand the continuity of the collection is disturbed, oversight and service rendered difficult. Entirely closed in a plan of a rectangular shaped building with strongly sustained axis system are the university libraries at Halle, Griefswald and Kiel. A plan of the latter is shown in fig. 69, from which it is seen that in such cases the possibility of extension is provided since it can be extended on the front. Very well adapted is the I shaped ground plan as is worked out in the Royal library at Stuttgart. In the front long building are the book rooms and in the rear cross wings are the rooms for administration and for the public; later extension of the stacks as well as of the administration rooms will be easily carried out. In the new University library at Leipzig, built in 1888-1891, a plan (fig. 72) with two inner courts or similar convenient separation has been designed; in the front facing Beethoven Strasse is situated the administra-



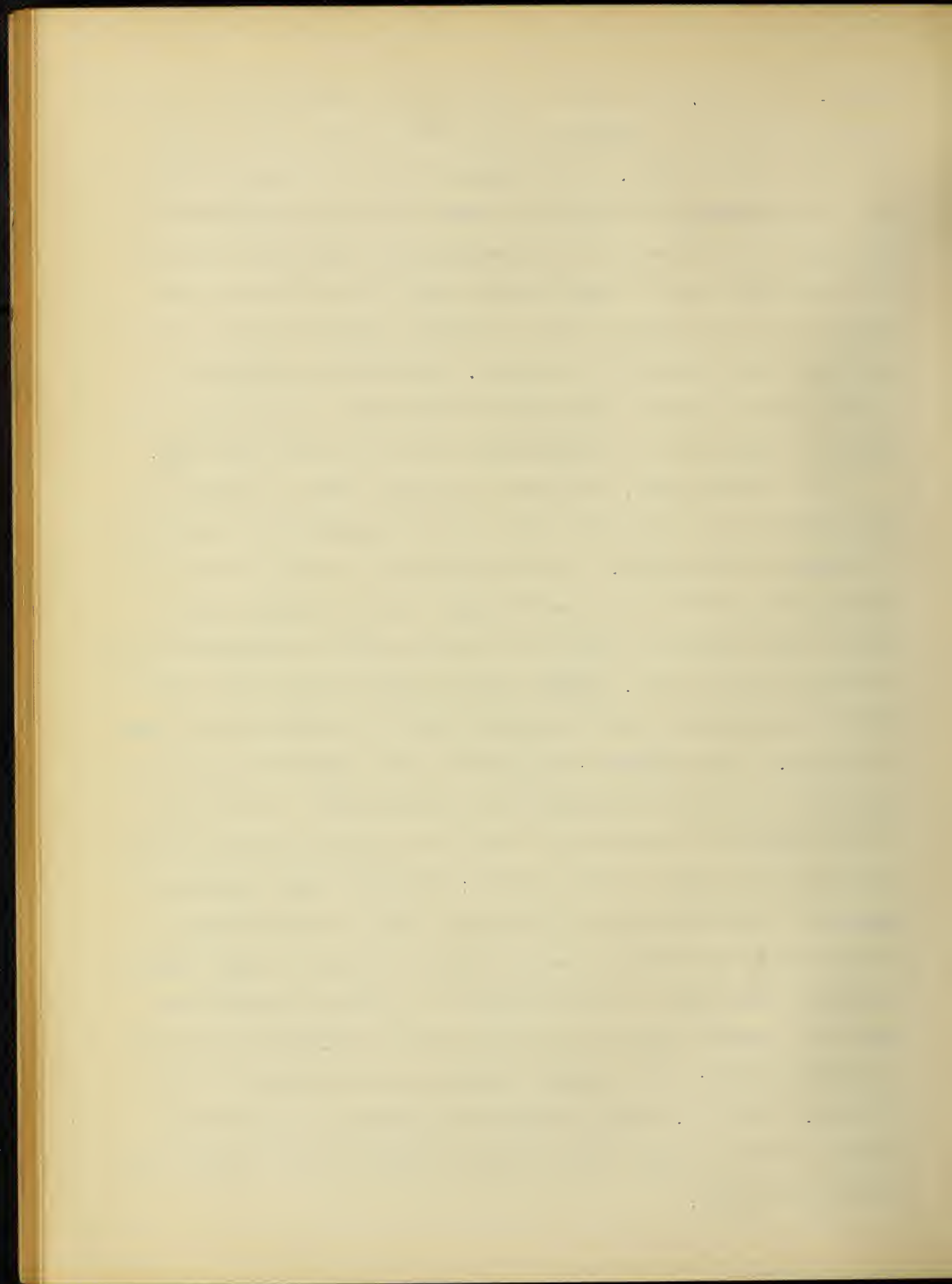
tion rooms to which the book rooms are organically joined. The new Ducal library at Wolfenbüttel(1182-85) shows a similar arrangement, yet here the reading room with only 16 tables plays a subordinate part, on the other hand the great exhibition hall (fig. 72) is given the predominance . The old Ducal library at Wolfenbüttel has already been shown as a central plan and the extension of the library of the British museum at London is also based upon the ground plan of a central building. Worthy of mention is a competent plan of Delessert which originated during the work preparatory to the Bibliothèque nationale at Paris. This central building is destined for the reception of 800,000 v. and covers a ground area of about 7000 qm. Reading and administration rooms are placed in the centre of the entire plan, the book rooms are placed around it in the form of a circle. For this plan the idea was that the books should be placed conveniently near to the reading room. Here to all appearances belongs the Library of Parliament at Ottawa built by Fuller and Chilian in 1880. The exterior of this building is given in fig. 71.

In all these central plans the problems of light and ventilation are rendered difficult; extension can only be undertaken with difficulty and the cost of the building must naturally be much greater than with the ground plan of a rectangular building. Plans and executions of them are not lacking to improve and increase the ability to extend. Wyatt Papworth worked out a plan (fig. 75) for a larger library based on that of Delessert in which the book rooms can be added gradually to the twelve sided reading room in circular form corresponding to the growing need. The same idea as carried out in a plan (fig. 76) in which around the circular and centrally placed reading room the stacks are added in a spiral; the possibility of extension is secured as long as the vacant space in the lot will



permit. The exterior of such a building will naturally not be altogether favorable. An attempt has been made to carry out the same idea but in another way. At the World's Fair in Vienna in 1873. a plan for a library at Palermo was issued which was characterized by the same central location of the reading room from which radiated six wings which were to serve as book rooms. Only a few of these wings were to be added and later as growth necessitated the rest of the wings were gradually to be built. If after the completion of the six wings a greater enlargement of the stack was necessary this could be accomplished by lengthening some, if not all the wings.

In a different way, Smithmeyer and Pelz tried to provide for the extension for a long time in the plans draughted for the National library at Washington. As the ground plan (figures 77 and 78) shows, in the centre of the entire plan lies the reading room to which a large number of wings are attached which are considered collectively as the stacks. First only the wings lying in the outer part of the plan and those connecting them to the reading room are to be used. As the growth increases then the rest of the wings in the interior of the building are to be constructed. If this part of the building is extended no further, the capacity of the library will not exceed 2 1/4 million volumes; first the rooms serving as museum and exhibition halls in the upper part of the building can be rearranged and fitted up as book rooms. Smithmeyer later draughted another plan which, in consideration of gradual extension was based on a similar ground plan and in 1889 the fulfillment of this was already begun; this demanded an expenditure of from 50 to 75 millions. The U. S. chief of engineers received a commission to draught a plan in which it was stipulated that the cost should not exceed 20 millions.

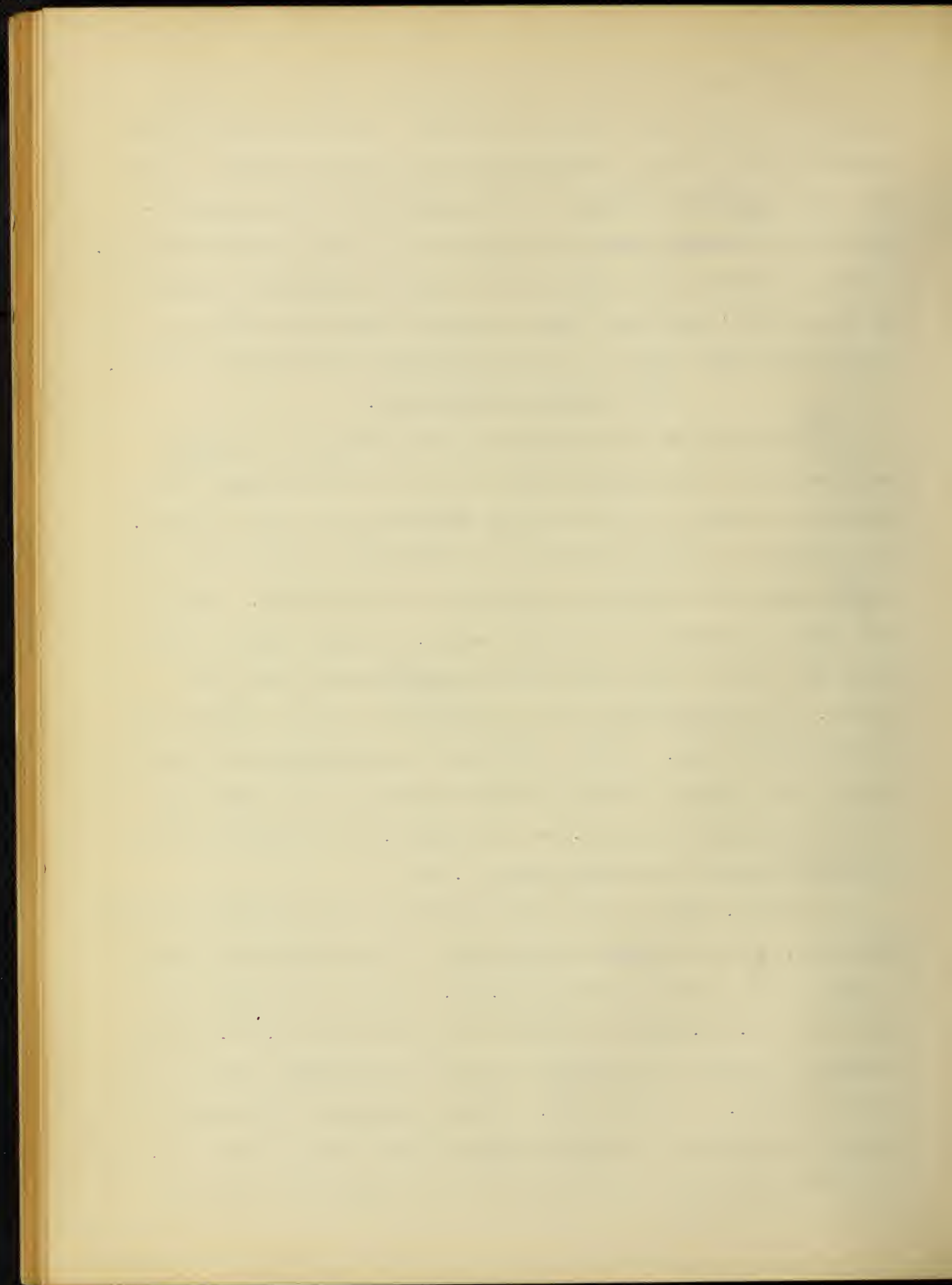


If a library is built as the constituent part of a building which has to serve also for other purposes the ground plan should conform suitably to the organization of the entire building. Finally another type of library is to be considered which in connection with the museum bears the character of a public exhibition hall. In such an erection the interests of suitable arrangement steps into the back ground; practical ideas are more or less are considered and in the first place stress is laid on favorable architectural effect.

47- Exterior Architecture.

If the aspect of the exterior of the building is to appear characteristic of the destined use and aim of the building, it is difficult to fulfill this task in an harmonious way for a library. The difficulty is still greater if the different uses for which the various rooms serve are to be expressed on the exterior. For the book room, on account of sufficient light, a slight axis is to be chosen and for the libraries with stack system, low ceilinged stories. Both measurements will be inadequate for the reading and administration rooms. It will therefore be advantageous for the exterior of the library to have a wide separation of the book room and the administration rooms. as for example, it is carried out in the Royal library of Stuttgart(See art. 46)

In the fig. 80-82 parts of the facades of the libraries at Halle Greifswald, and at Göttingen, are given. In the university library at Halle are two stack stories of 2.3 m. joined to the main building story of 4.6 m. height with an axial division of 4.1 m. In the university library at Greifswald a similar arrangement with an axial division of 4 m. is carried out. In the extension of the university library at Göttingen, the extent height of the ground floor of 5.5 m. had to be maintained, in the facade of this a horizontal division

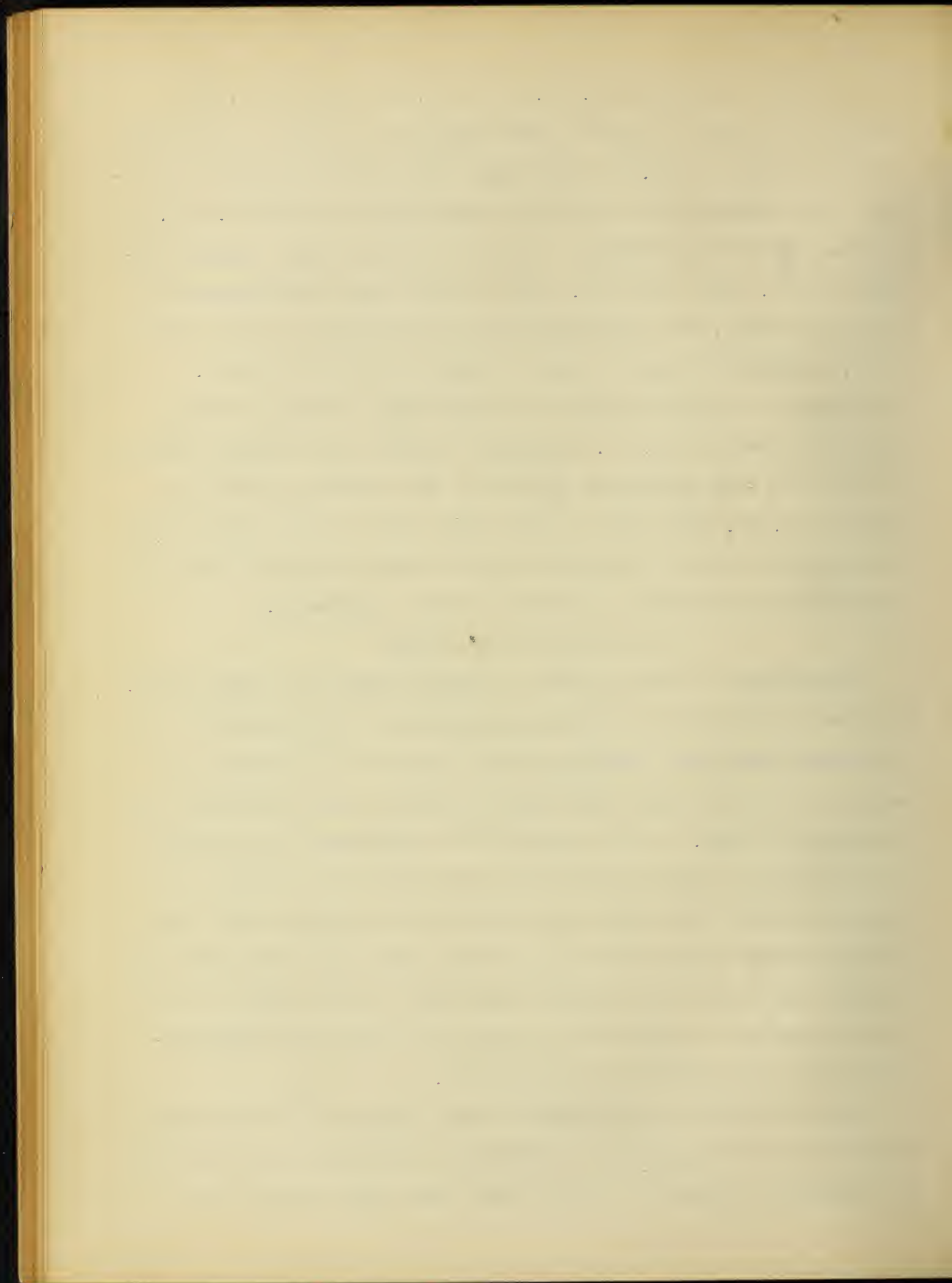


with an axial division of 3.1 m. 20 4.8 m. was undertaken. The facade of the Royal library at Stuttgart which belongs to the stack system is shown in fig. 85. The facade here is constructed independent of the construction of the book room with an axis of 5.4 m. and an extensive and magnificent arcade was erected whose rounded windows are 4 m. wide and 9.6 m. high over the closed architecture of the ground floor. More characteristic is the facade of the library of St. Genevieve at Paris a part of which is shown in fig 83. The system of the main facade of the new Ducal library at Wolfenbüttel is shown by fig. 84. Different from the other library facades but none the less successful is that of the Valliano library at Athens (fig. 86). The union of the whole plan so that the central room contains reading and administration rooms and each of the two wings forms stack rooms is brought to clear expression.

48. Interior architecture

Development of the interior is usually limited to small space. The idea borrowed from the Italian architects of the sixteenth and seventeenth centuries, to arrange the interior of a library as a book hall or row of book halls and to furnish them with pillars and galleries (see fig. 47, 53, 56) does not correspond to the demands of our northern climate or to the present needs of a library. In a southern country the library hall cannot be too large or too light for the greater part of the year so that people may stay there comfortably and during the centuries mentioned a single hall was considered room for a library for a long time, taking into consideration the natural condition of the books.

As the result of the unusually rapid growth of the collections in our country the greatest possible use of the space for practical and reasonable grounds, is to be taken into consideration before all



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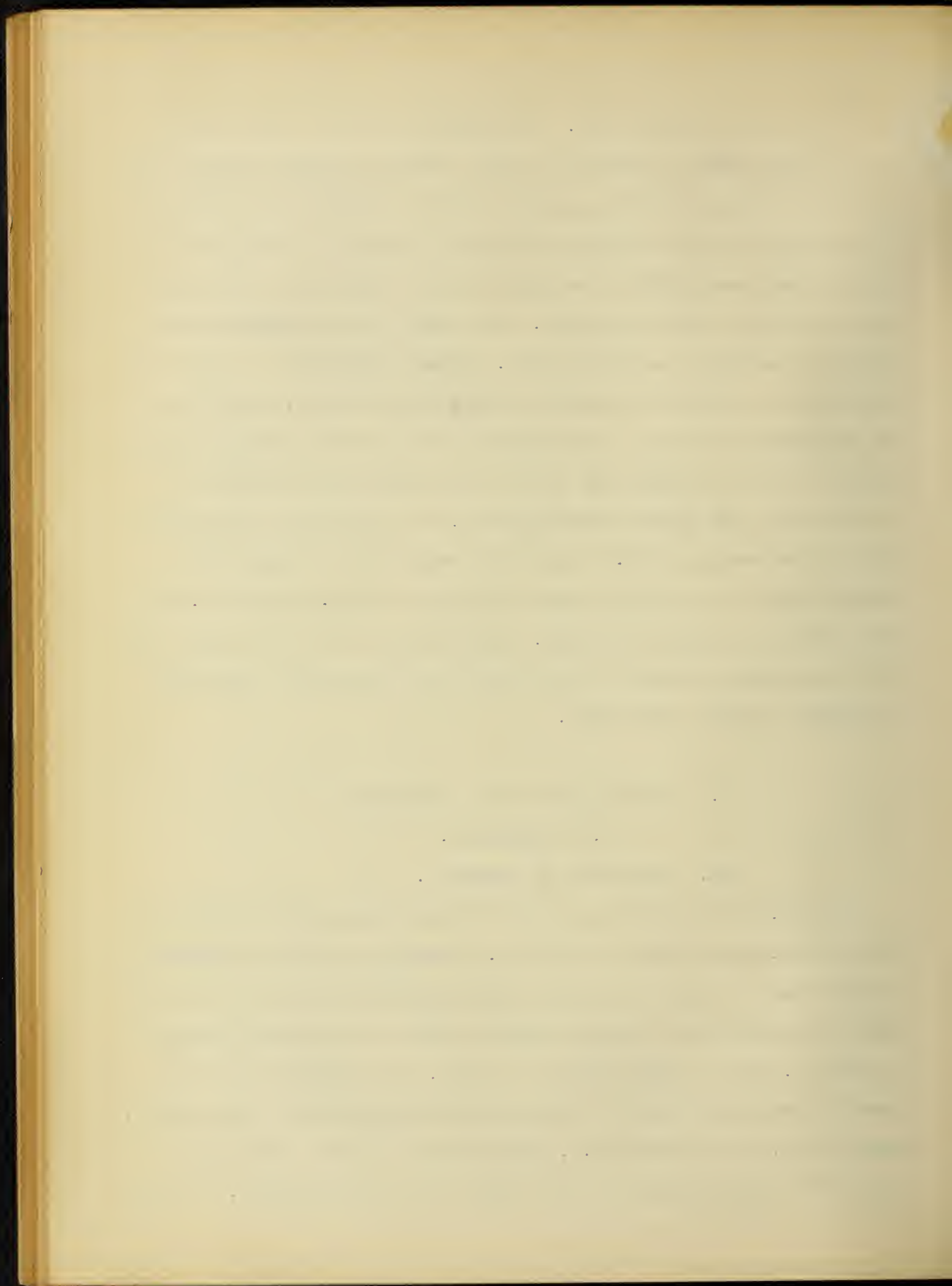
things and for this reason all unnecessary furnishing of the book hall is to be dispensed with. An exception to this will only be made in those cases in which the book room for special reasons has to serve as delivery room as in the library Grenoble, or where, as in the historical hall in the university library at Göttingen in the old Pauliner-kirche it is destined for a museum or for study rooms for famous local scholars. Book rooms can only make a showy appearance suitably as stack rooms. Simple furnishing is demanded more when the entire wall space is filled with books. According to the intended use of the library and to the locality, architectural decorations will extend only to the furnishing and development of the entrance, and public delivery room, and especially the adornment of the reading room. The latter have been developed into stately magnificent rooms in the libraries of Ste. Genevieve, the Bibliothèque nationale at Paris, the library of British museum and the Guild Hall at London, as well as in the university libraries in Leipzig, Vienna, Buda Pest.

c. Details and their arrangement

1. Bookrooms.

49. Bookrooms in general .

In Art. 37 the details of collections which are to be kept and made of use, were clearly set forth. Naturally books will form the greatest part of the collection, and consequently the hall in which they are stored will form the greatest part of the space destined to hold it. Other rooms besides this one, are necessary for the preservation of the rest of the collection(engravings, maps, music, manuscripts, rare books etc.), which rooms are of a number and proportion corresponding to the extent of the collections. In the



following under (1), the book rooms with their fittings will now be studied, which under (2) the rooms assigned for the preservation of the rest of the collection will be described.

(a) General.

50 System

The question of the best way to care for the books is of great import to each library, since not only their maintenance and preservation, but also their distribution and easy use are very dependent upon it. As was formerly explained under (b) there are three distinctive systems, for the order and arrangement of the book room.

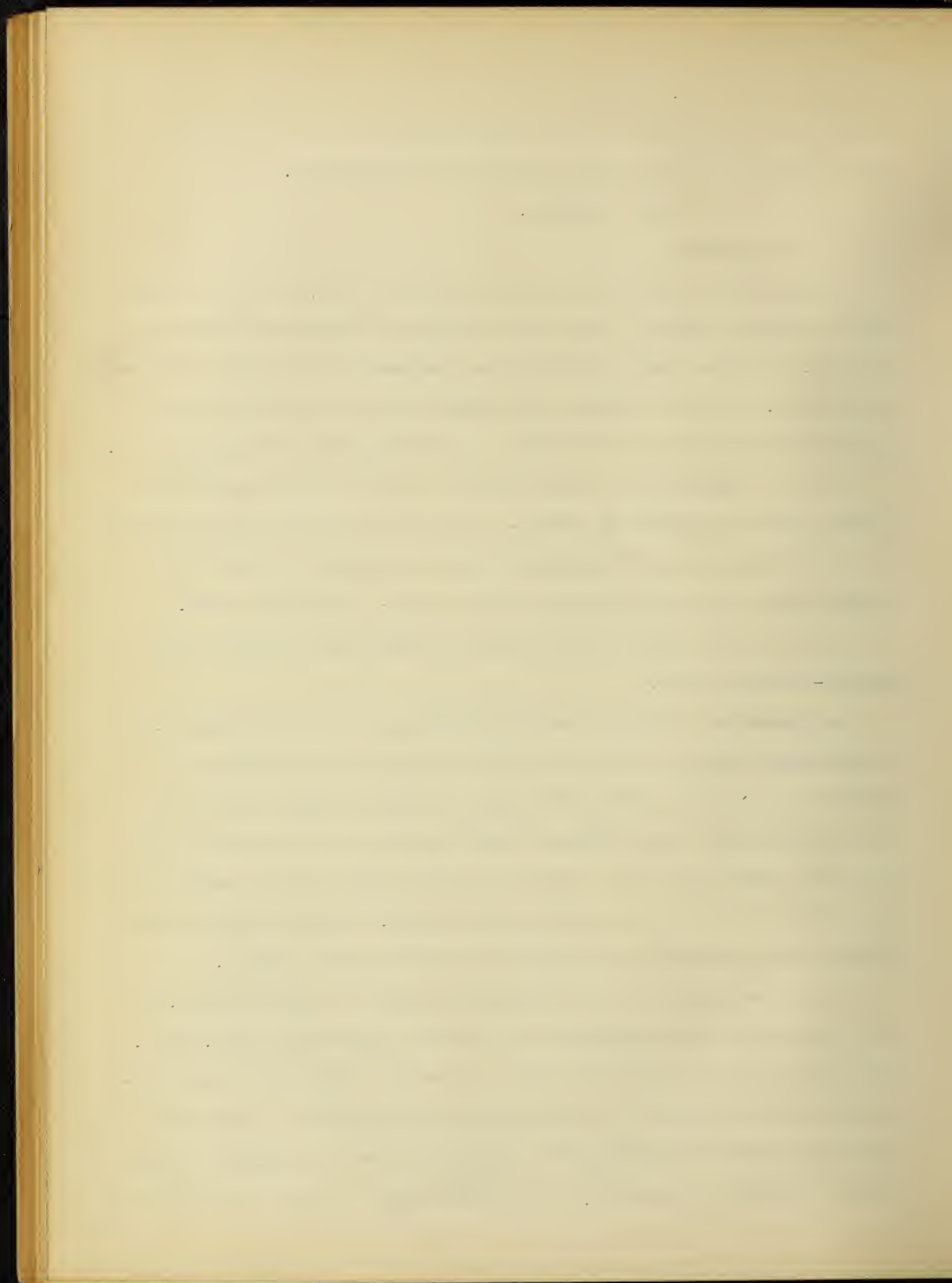
(1) The stacks run up the entire height of the room, and the highest part is reached by ladder- book rooms with the ladder system.

(2) The stacks are furnished with galleries, by which the highest tiers are accessible and easily used- gallery system.

(3) The book rooms are divided by intermediate floors into stories- stack system.

In libraries which are built according to the stack system, it is customary usually, according to the size of the collection to furnish one or several large book halls, which contain the stories built through the stacks without any separation by massive ceiling. Only those books which are especially set aside from the rest of the collection are put in the smaller book rooms. Surveillance over the library must necessarily be obtained in the highest degree.

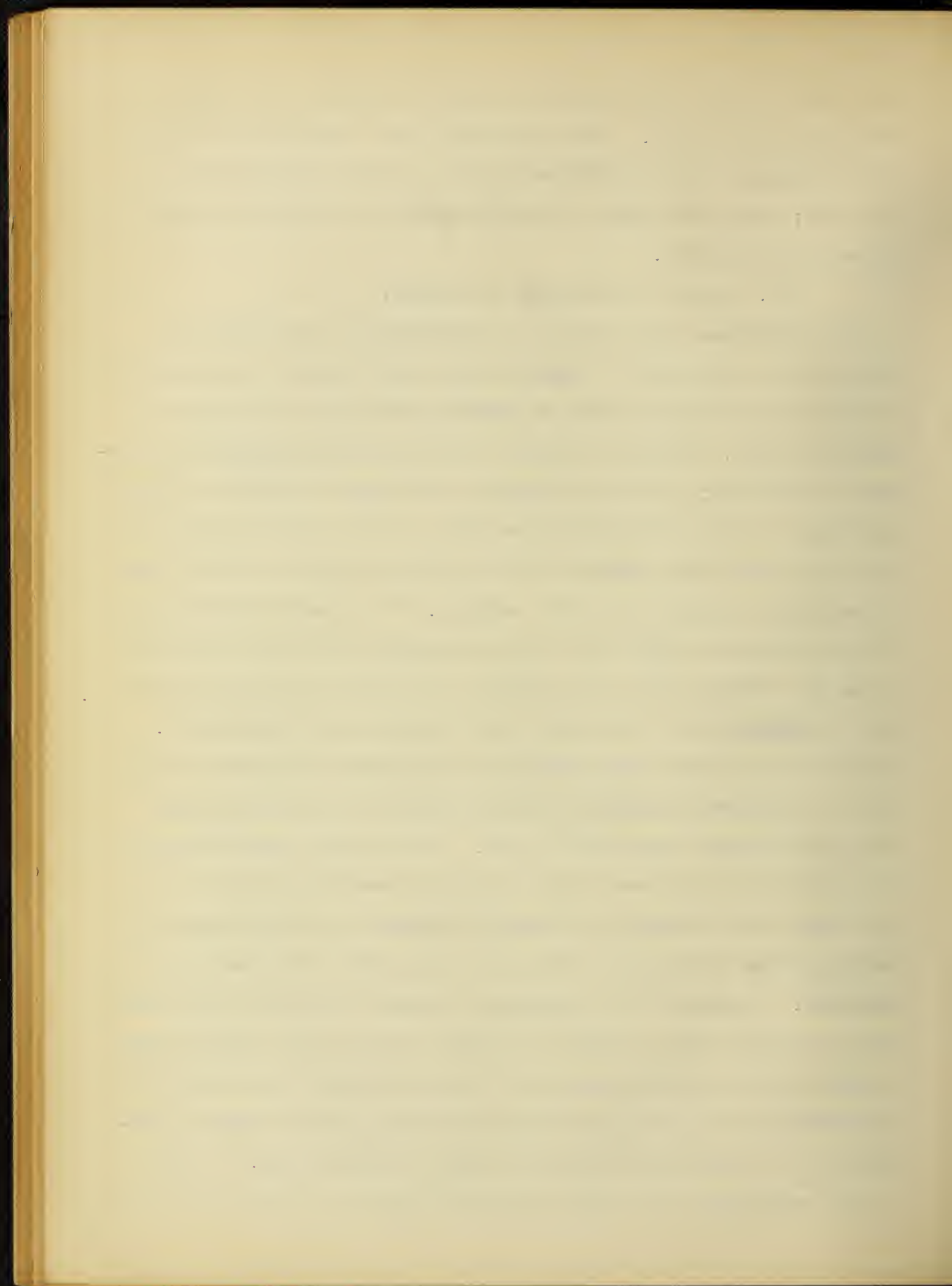
In the building of the University library at Leipzig (fig.70) this method has been abandoned and for the reception of 800,000 v. they have assigned the greater part of several halls which are separated from one another, to guard against fire, and in which the stacks are only so high that the upper shelf can be reached without the aid of steps or ladders. In the new Royal library at Wolfenbüttel



(fig. 75) they have also proceeded in such a manner in the construction of the book rooms. These are built with a capacity of 400,000 v and so arranged that the different parts of the collection can be separated; iron doors make it possible in time of danger to shut off one room from another.

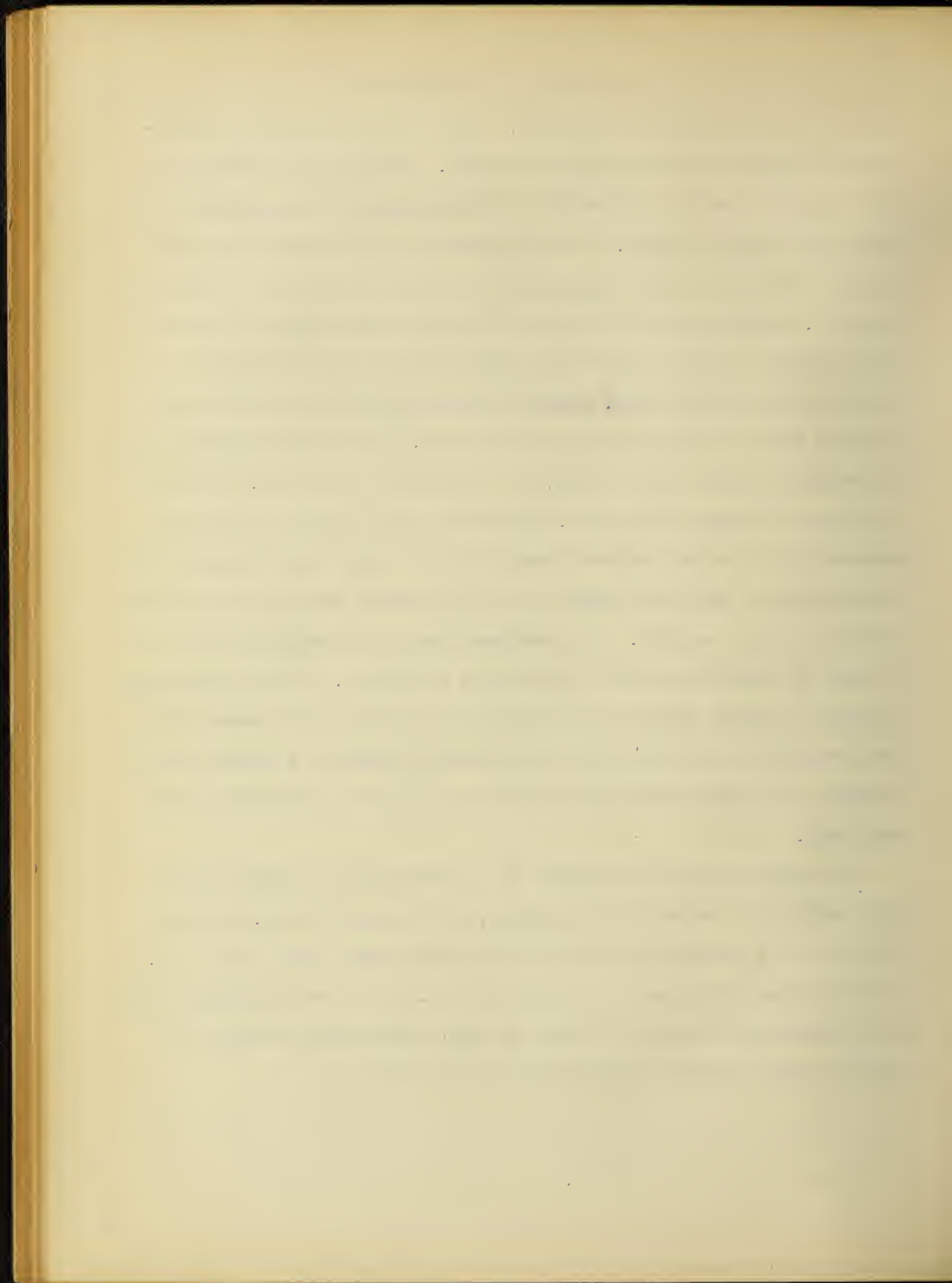
51. Manner of arranging the books.

The usefulness of a library is influenced by the manner of arranging the books and it depends upon a good suitable arrangement of this whether advantage may be derived with greater or less care and convenience. In many libraries the following mechanical arrangement is practiced; the books separated according to size but without any regard to their contents are arranged on the shelves corresponding to the continuous numbers of the catalog so that to find a book necessitates constant use of the catalog. It is easily seen without further explanation that with this arrangement it is very difficult to use the library and in this chaotic condition of the collection must be found reasons which make this system appear undesirable. Opposed to this stands the systematic arrangement of books in which they are arranged according to their contents and the individual groups are shelved according to form. In this the availability of the collection is assured in the highest degree and the use of it is so easy and convenient by bringing together an entire branch of knowledge that consultation and use of the books in the book room is furthered. Moreover this arrangement renders the work of the staff easier, for they will be able by a hasty glance at the single class to find from the entire group, the work desired and this is one of the essentials of good library administration and can never be obtained by an enumeration merely existing in the catalog. So that in this arrangement the single collection may in a proper way keep



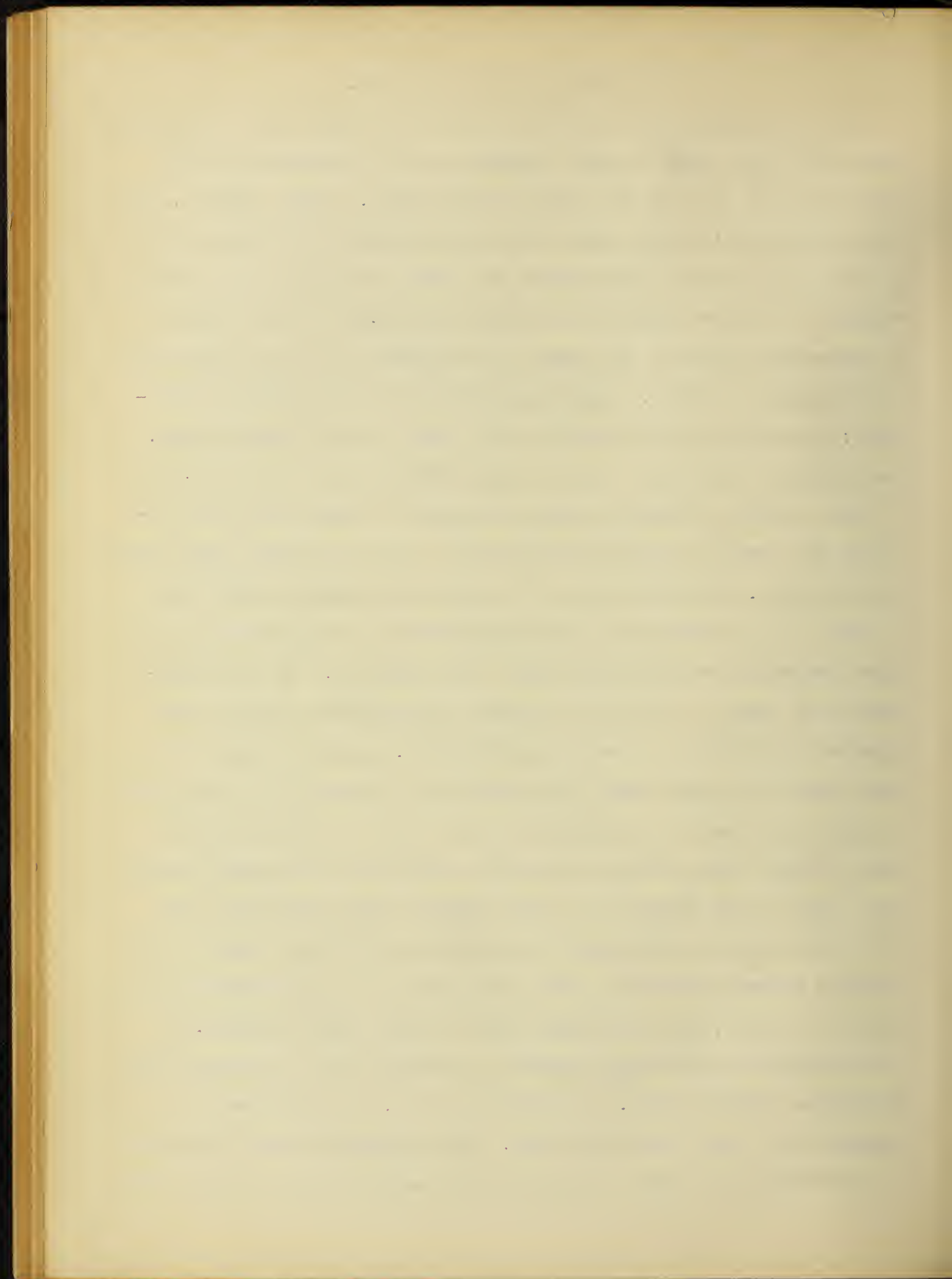
their location for a long time, it is necessary to take into account space for the growth of the group. Only in this way can the continual transferring of books be avoided. Division by form is by folio quarto, octavo, the smaller forms duodecimo and septimo are best placed under octavo. For adjustment in the distinction in height within the sizes spoken of it is best to introduce suitable shelves. Unusual sizes exceeding folio are best placed on special shelves apart for the others and these are to be placed when possible near the allied group. Here and there gradation in the height of books for the construction of book stacks have been decided upon; for example, those under 29 cm. and those from 29-45 cm. with the exception of books over 45 cm. which are given special location. Moreover it is to be insisted upon that the books stand upright on the shelves so that the author and title can be easily read and the binding does not suffer. The American custom of putting books on an edge to economize space deserves no imitation. Where duplicates are kept in great numbers and where it is usually the custom they are intended for loaning, they are usually added to a special collection in the book room and arranged as near as practical to the loan desk.

In English public libraries it is customary to shelve those books which are loaned to the public, in a special room. (Lending library) This usually is joined to the loan desk, (See, under e 4.) and only separated from it by a partition. It is very important that all groups on the stacks as well as each individual division be supplied with distinct inscriptions and labels.



52- Lighting during the day.

The rooms serving as repository for the collections if possible, should not have south or west exposure for the influence of the direct rays of the sun is harmful to the books. When, however, windows are placed in these sides they are provided with frosted glass by which not only the direct rays but even the passage of light is weakened as in the libraries of Leyden and Halle or else curtains of dust-proof material are hung in the windows as in the Bibliothèque nationale in Paris. Lighting for the book rooms must be plentiful; according to the location side light or sky light is used. The lighting of the book rooms in old libraries with the exception of some central buildings already described in which light was obtained from above, was procured from the side and in most cases from one side only. As the depth of the book room became greater such a light did not suffice and with the book halls built according to stack system it was naturally still less adequate. By the introduction of iron as a building material for supports and roof the question of light was solved in another way, namely in rooms of great depth the light came from skylights. Although it is possible to light the stacks by skylights alone still in detached buildings one must never dispense with side lights for the simple reason that these can be regulated in the simplest manner and that they afford the room the advantage of a continual efficient light. The distance between the axis of the stacks must be large enough for the axis of a window, and the window must be built wide and high. Or the principle of the plans executed at Rostock Halle Greiswald Kiel Göttingen, Stockholm etc., the depth of 20 m. to a room can be planned with light from both sides. With light from one side even if the windows are light as possible one cannot light the room with



a depth of more than 6 or 7 m.

The choice of light from above generally depends on the fact that it is difficult to obtain light from the side or the exception must be taken on account of the location of the building. In the plan of skylight it is essential that light must be sufficient for several stories of stacks and on this account the floor of each story must be constructed of transparent material. According to the experiences of the Bibliothèque nationale of Paris and the University library at Leyden the number of stories can hardly exceed four. Lighting the book room from above with the exclusion of side lights was first introduced in the extension of the library of the British museum at London completed in 1876 by Robert and Sidney Smirke. Because this extension was built in a large court of the museum, as is shown in Art. 46, lighting from the side was practically eliminated. A still greater development of this system of lighting was carried out in the extension of the Bibliothèque nationale, of Paris which after the death of Visconti, first architect of the library, was completed by Labrouste. Under the large reading room stacks were built for 900,000; these were placed within 4 strong walls which had no opening in the side for light. Light for the rooms came from the entire extent of the roof; the stacks had five stories of 2.3 m. height, still on dark days light was inadequate. Skylight has a notable disadvantage that in bright sunshine the rooms directly under it are heated to an almost unbearable degree. In stacks this disadvantage is especially felt in the upper story, unless adequate precautions are taken against it. The most necessary precaution that an inner skylight be placed at a suitable distance from the outer one and the space between be opened to the air. It would be still more advantageous to depart from

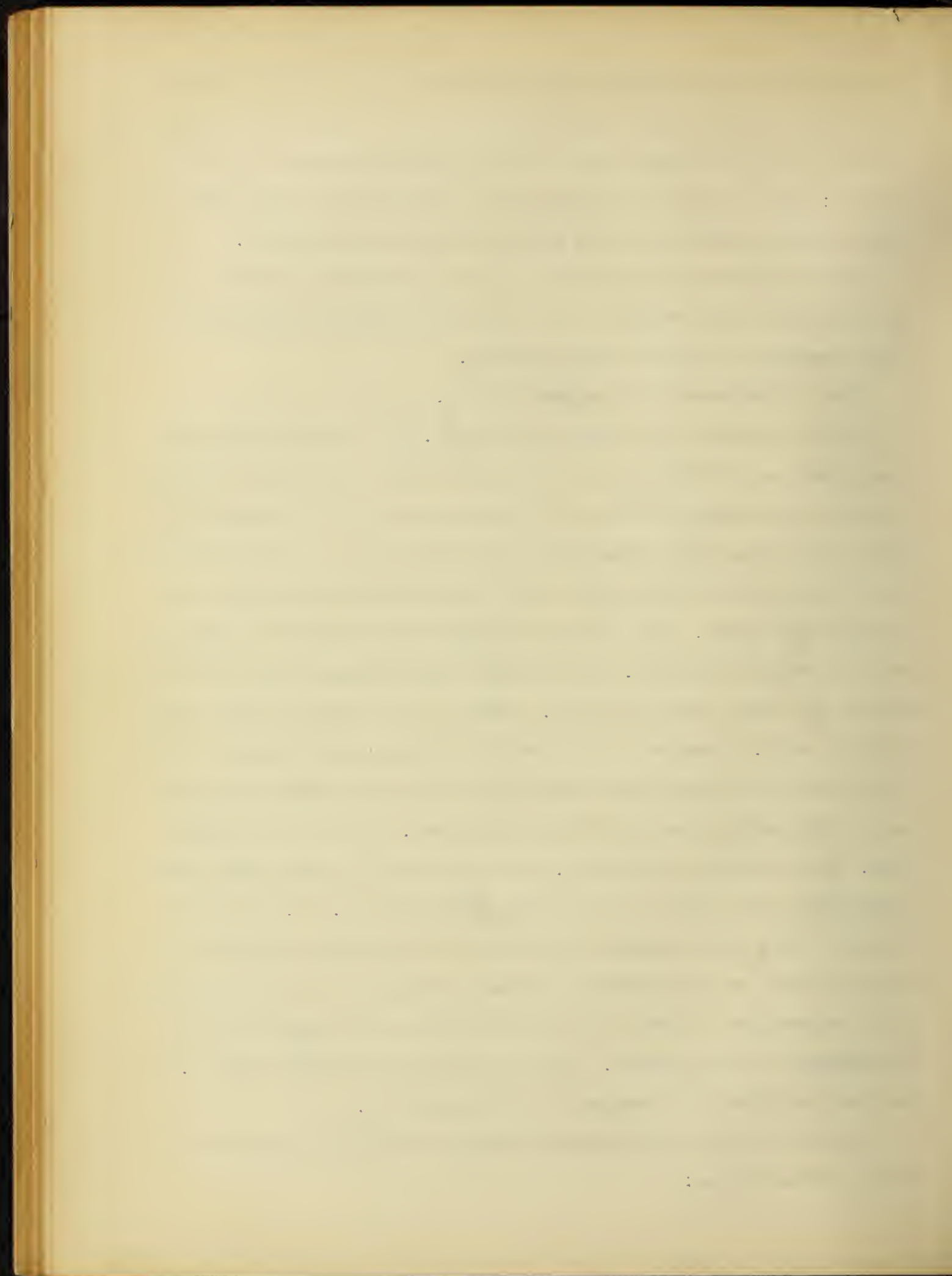
the plan of a flat skylight and build on the roof a sufficiently high turret through whose perpendicular sides light could penetrate. The side and roof lights have been used simultaneously in a suitable way; some of the new buildings are provided with just such mixed light and the result obtained have been very satisfactory.

In the university libraries of Halle Greifswald and Kiel most of the light comes from the side, still the middle aisle with its ladder system is lighted from skylight.

53- Arrangement of the book stacks.

It has already been explained in Art. 43 the most favorable economical use of the space in the stack room is obtained by placing the stacks across the room at right angles to the longitudinal walls and making them accessible from both sides. In that way originated the double stacks which have the appearance of partitions dividing the room. The distance between these stacks is sometimes smaller sometimes larger. The shorter the distance the easier the use of the room and vice versa. For the usual depth of the stack the axis of 2. m may be considered the minimum; then there is left free between the neighboring cases an aisle wide enough to permit one to turn around easily without hindrance. The use of ladders (Art. 63) is hereby eliminated. If one wishes to work still more comfortably, one must make the axis up to about 2.5 m. But since in many German and Austrian university libraries the stacks are used not only by the staff but by the professors and other scholars, it is imperative to obtain by choice of axis, the possibility of arrangement of the alcoves. In such cases axis of more than 3. m has been selected and even up to and beyond 4 m.

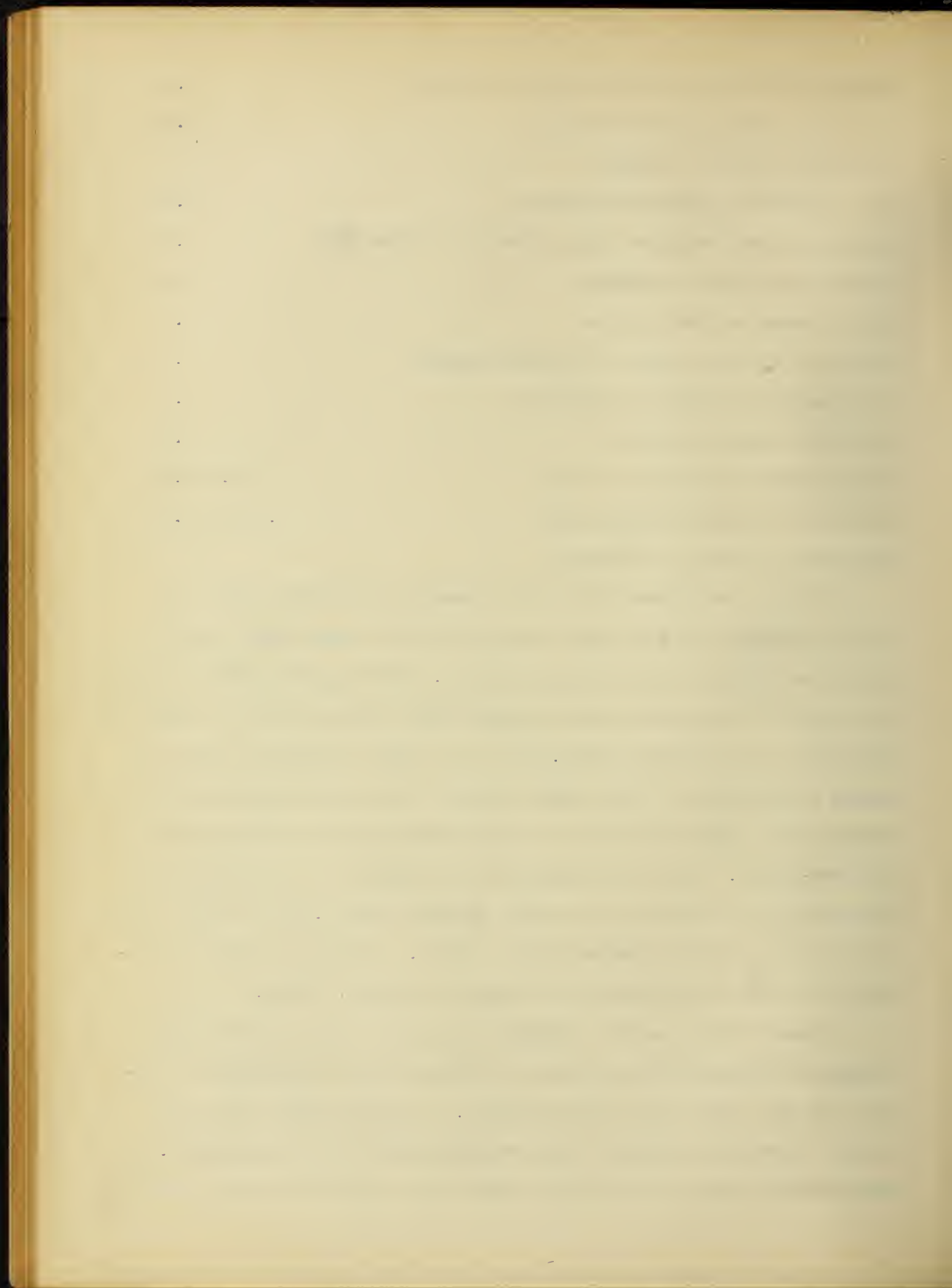
In differently constructed libraries the axial between the stacks is as follow:



Library of the New record office at London	1.53	m
University Library at Greifswald	2.	m
University Library at Kiel	2.	m
City Library at Frankfort-a-Maine	2.05	m
Library of the Technical high school at Darmstadt	2.06	m
University library at Halle	2.1	m
Ducal library at Washington	2.1	m
Extension of the library of British museum	2.44	m
Royal public library at Stuttgart	2.7	m
Valliano library at Athens	2.8	m
Bibliothèque nationale at Paris	3 m. & 3.21	m
University library at Göttingen	3.1 m & 4.8	m
University library at Leipzig	4	m

It has already been said in a preceding paragraph that in stacks lighted from the side the axis of the stacks must be of a proportion suitable for placing windows. Starting from this a natural arrangement originates in this manner, that the axis may be equal to the width of the windows (fig. 28 and 30) The former will then be placed at the edge of the window and the light entering through the windows will light in the most advantageous way the entire face of the book-cases. Such an arrangement of windows is only to be recommended if the axis of the stacks is more than 2.75 m, with a smaller axis, too narrow windows would result. In such a case the windows and stacks had better be arranged like fig. 89-91.

In some stacks as for example in part of those of the Royal library at Stuttgart in placing the stacks the arrangement of windows was not taken into consideration. In book rooms which are mainly lighted by skylight such consideration is not necessary. Stacks which come to the window jambs can either be placed close



together or leave a passage along the wall(fig. 89 & 91, 71) which is favorable for communication and for lighting but which lessens the space for the stacks. Such a passage would not be wanting is the axis of the window and stacks be correlative. Book rooms especially those with stacks often have such depth that the stacks are not used nor separated but a middle aisle is arranged, perpendicular to which run the aisles of the stacks. This central aisle is used for the erection of a stairway, to be discussed later, which joins one story to another. If the stack room is only lighted from above the intermediate floor over this central aisle is interrupted by a large opening protected with a railing through which copious light can penetrate.

b. Book-stacks and their accessories.

54. Stack measurements.

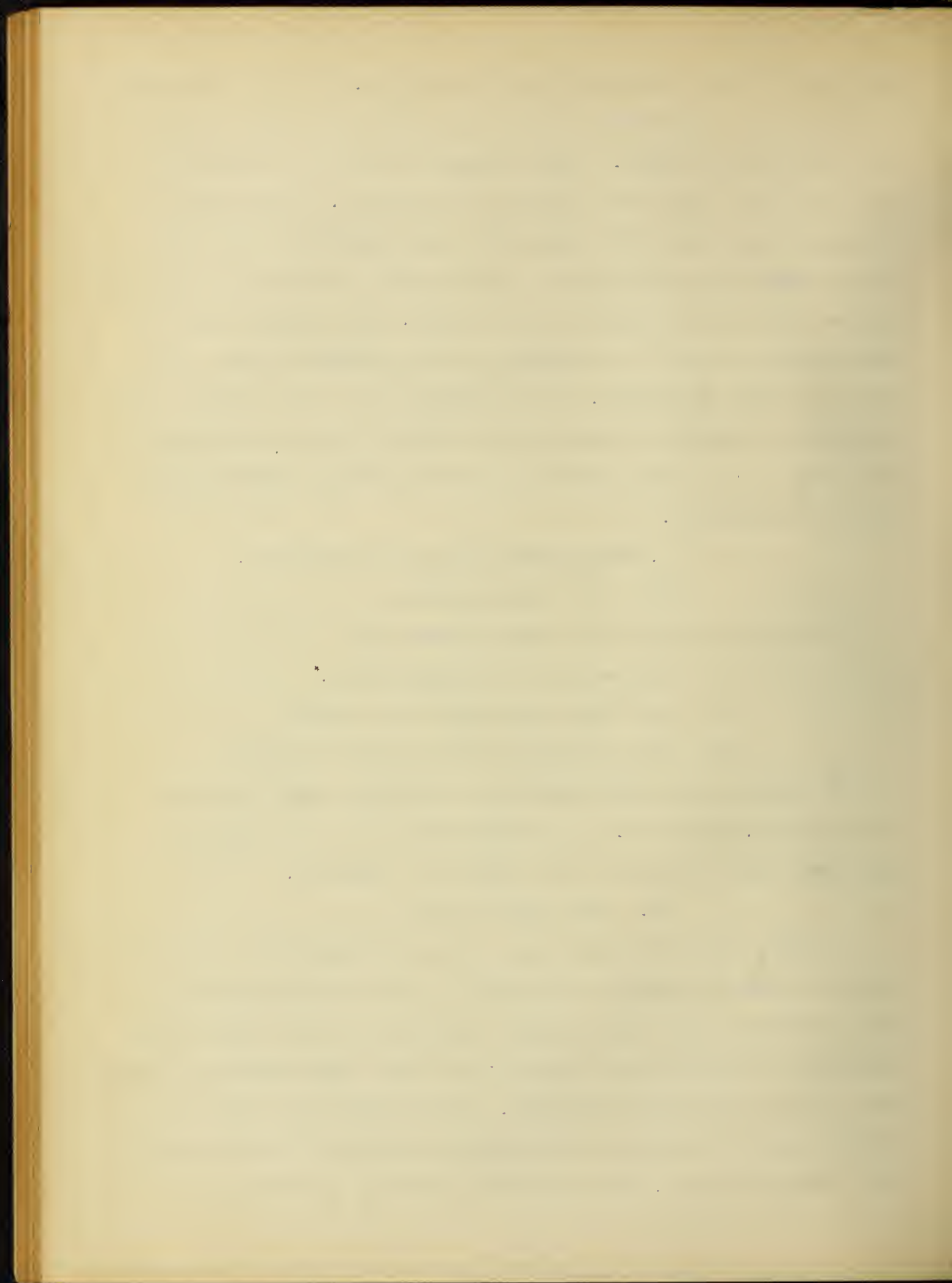
The measurements of the stacks depend upon

- (a) the manner of arranging books.
- (b) the number and size of the books.
- (c) the question of the eventual increase.

In regard to the first point the essentials have been mentioned in art. 51 and 52. As to the second point the extent of face area which the stack offers comes into question.

55. Face area of stack.

In cases where new stacks are to be constructed for the present collection and its apparent increase it is best if one ascertains the proportion of the single groups according to their size and the longitudinal extent of the shelving; and after that accurate arrangements can be made for new shelving. If the number of books to be stored is not at all or not very exactly known, or if one is content with a rough estimate, one can nearly correctly calculate on an

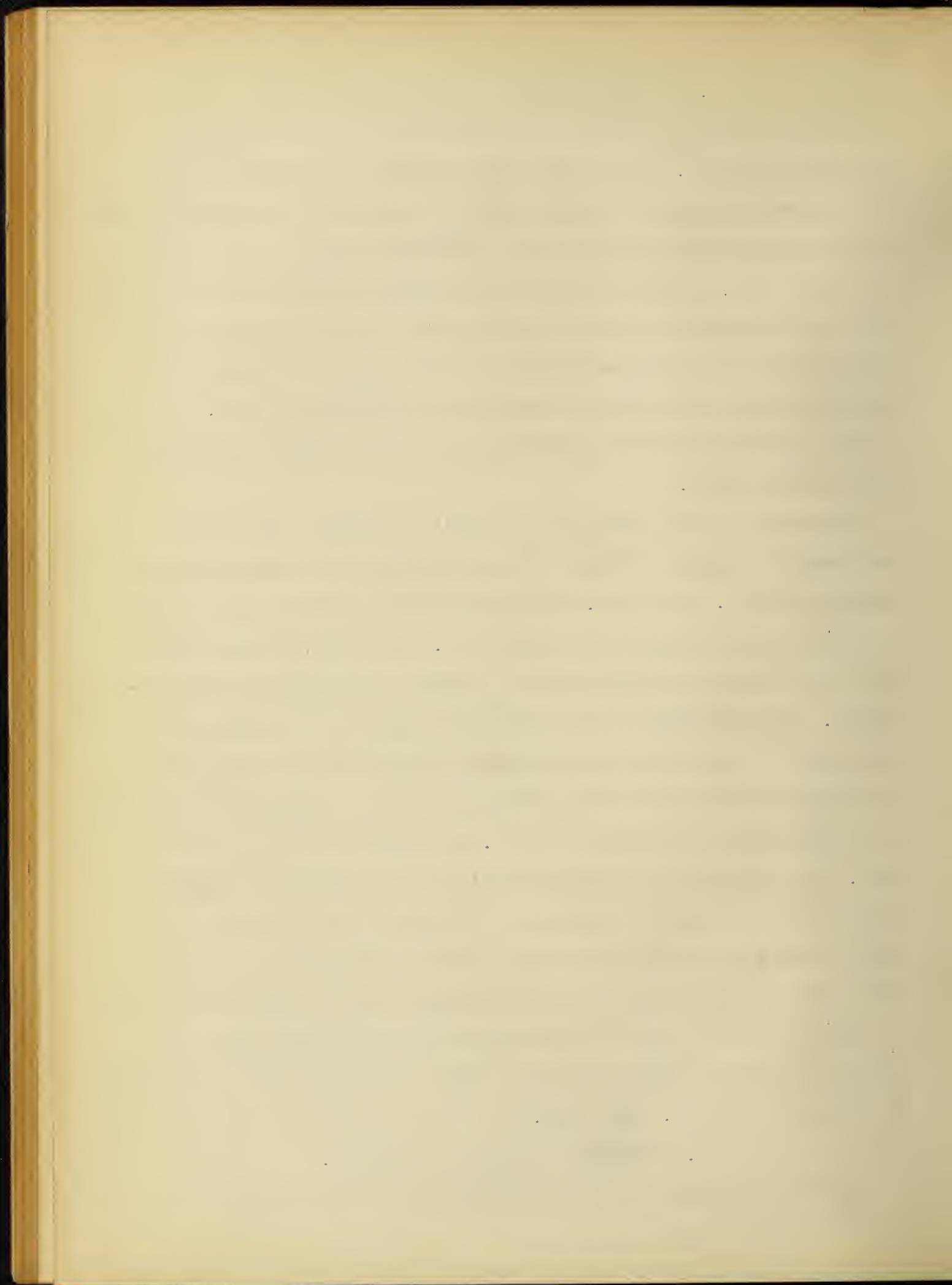


average of 100 v. to each 1 sq m. of face area. In this average the uprights and the supports required in the shelves are taken into consideration. In the University library at Greifswald, Gropius and Schmieden have reckoned upon the unit 9130 v. to each 1 sqm while Staender after an exhaustive ~~increase~~^{research} arrived at this conclusion, "that in buildings planned for libraries of the same construction and organization as that at Greifswald for the estimate of the dimensions of the book room under the supposition of stacks constructed similar to those at Greifswald an average of 62 v. to 1 sqm of face area must not be exceeded if one would avoid a disagreeable disappointment.

Contrary to this theory is Gilbert's statement that recent measurements carefully taken in the library at Greifswald show an average of 83 v. to 1 sq m. Gilbert is of the opinion that one must calculate on the estimate of about 80 v. to 1 sq m. of face area, yet he is inclined to decide upon a higher rather than a lower estimate. Wolff reported that in 1892 he elaborated an authentic plan for the city library at Frankfurt-a-Maine and for that purpose an invoice of the stack and a measuring of the stacks was taken; the result was that an average of 102 v. was shelved in 1 sq m face area. One can also agree to Gilbert's theory according to which the idea concerning our libraries is changed in the course of time, "for the more they are filled with the new products of the printing press and the less the quota of the clumsy sizes of folio and quarto of the 15th, 16th, and 17th centuries is in the total number of books, the greater will become the number of books which will later be shelved on 1 sq m. face area."

56. Distance between the shelves.

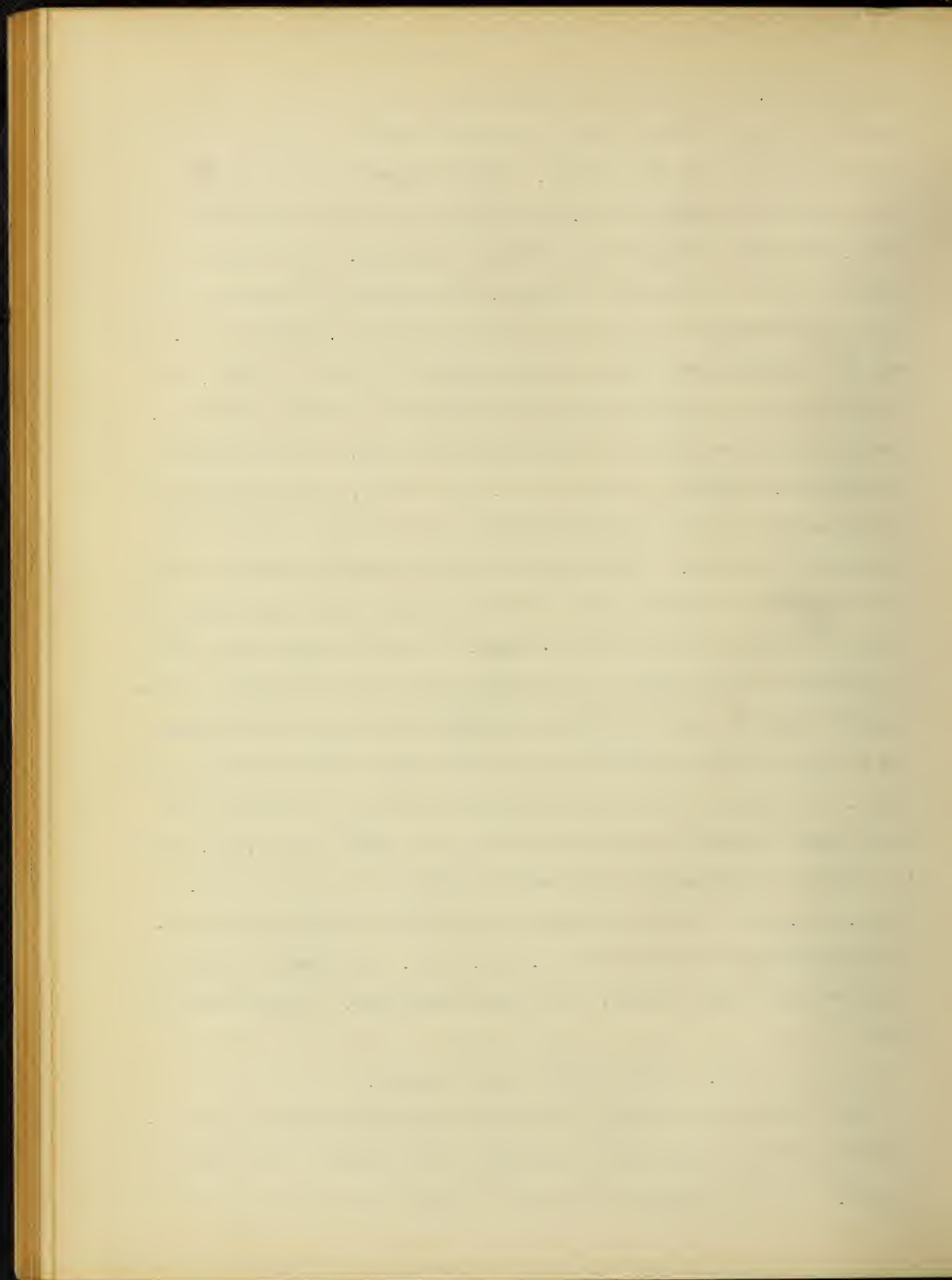
Of equal importance in the measurements of the stacks is the



distance between the shelves according to the different sizes given above. A firmly limited normal distance without too great divergence can be adjusted only to octavos. In most cases a distance of 25 cm has proved sufficient, 23 cm. can easily become too restricted and 27 cm. will only be necessary in rare instances. For folios and quartos a great difference is shown. The customary distance according to Steffenhagen for folios is 45 cm, and for quartos 33 cm. Moreover the distance for folios ranges between 37, 39, 41, 43, 47, 49, 51, 53, and 55 cm. and for quartos between 31, 35, 37, and 39 cm. The greatest distance then in no case exceeds 55 cm. for folios and 39 cm for quartos. Petzholdt allowed 57 cm. for folios, 42 for quartos and 28 for octavos, the normal height and, it is true, "rather somewhat more than less." The larger sizes are usually shelved in the lower rows, the octavo books and the smaller sizes which are placed with the octavos, on the upper shelves. It results then that either the shelves in each tier are separated according to the three recognized sizes or that in several storied stacks, the lower stories are assigned to the larger sizes and the other stories to the smaller sizes. Examples of the latter arrangement are to be seen in the Grand ducal library at Karlsruhe where the stack room 7.8 m. high is divided by two wooden intermediate floors (at a height of 2.7 m. and 7.31 m. over the ground floor, so that the single stories including bases and cornices are 2.49 m. high. The lower stories contain the large sized works, the second and third, the smaller sized ones.

57. Length of the book shelves.

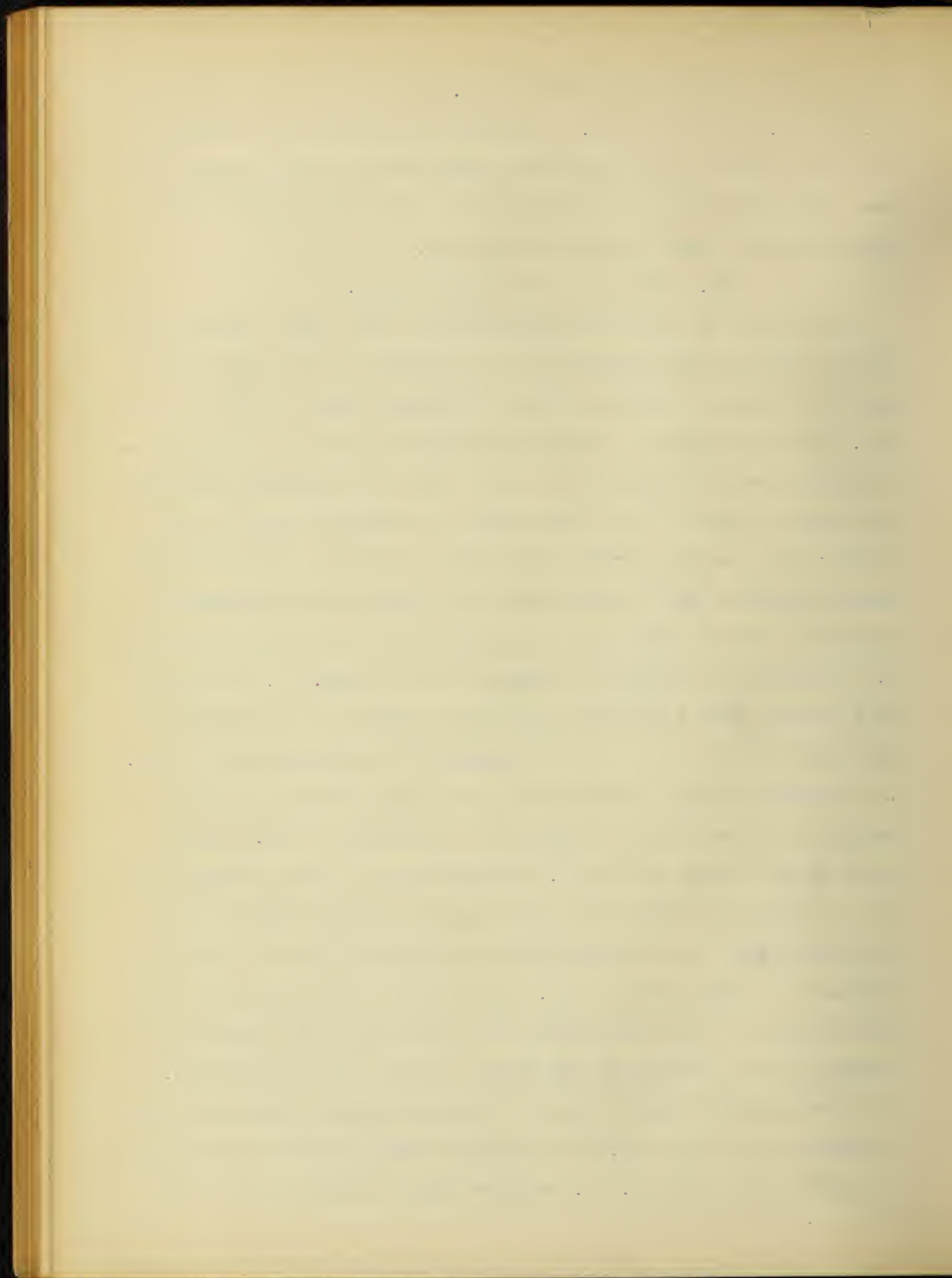
The shelves of a stack do not run along uninterrupted but individual shelves are formed by upright partitions or the stack uprights. It is to be desired in the interest of library progression



to give these shelves a uniform length, and for that the average of .9 m. to 1 m. is recommended. The uniform position of the upright partitions lightens the inevitable transference in the highest degree, for the latter can be carried out without any special oversight since the work is purely mechanical.

58. Height of the stack stories.

The height of the stack stories that is the space between the separate intermediate floors should be chosen so that could easily reach the uppermost shelves without a ladder, steps or other assistance. This determines a limited height which must not be exceeded. In order to use the space in the book room to the greatest advantage every loss of space in the height must be avoided as far as practicable; for a surplus trivial in itself, calculated for the entire available surface all of the stacks of a library must necessarily amount to a considerable waste increasing with the size of the library. Steffenhagen cites as an example that in 8456.4 m. of shelving and 6 stories with 9 shelves each, by an increase in the height of each story of 25 to 27 cm, the total loss of space amounted to 626.4 m. of shelving which is equivalent to the space holding 19,000 v. The loss of space would be similar if a surface of 2 cm. in the height of each story be wasted. Consideration not only for the suitable arrangement but also for good lighting and convenient use of the books makes it necessary that in every story directly over the intermediate floor a base 20 cm. high should be constructed so that the books may be protected during the cleansing of the floor and the stooping to get a book from the lowest shelves will be lessened. If it is now arranged that the top shelves may be used easily and safely without any assistance, the available face of the stack may have no greater height than 2.2 m. measured from the upper side of the



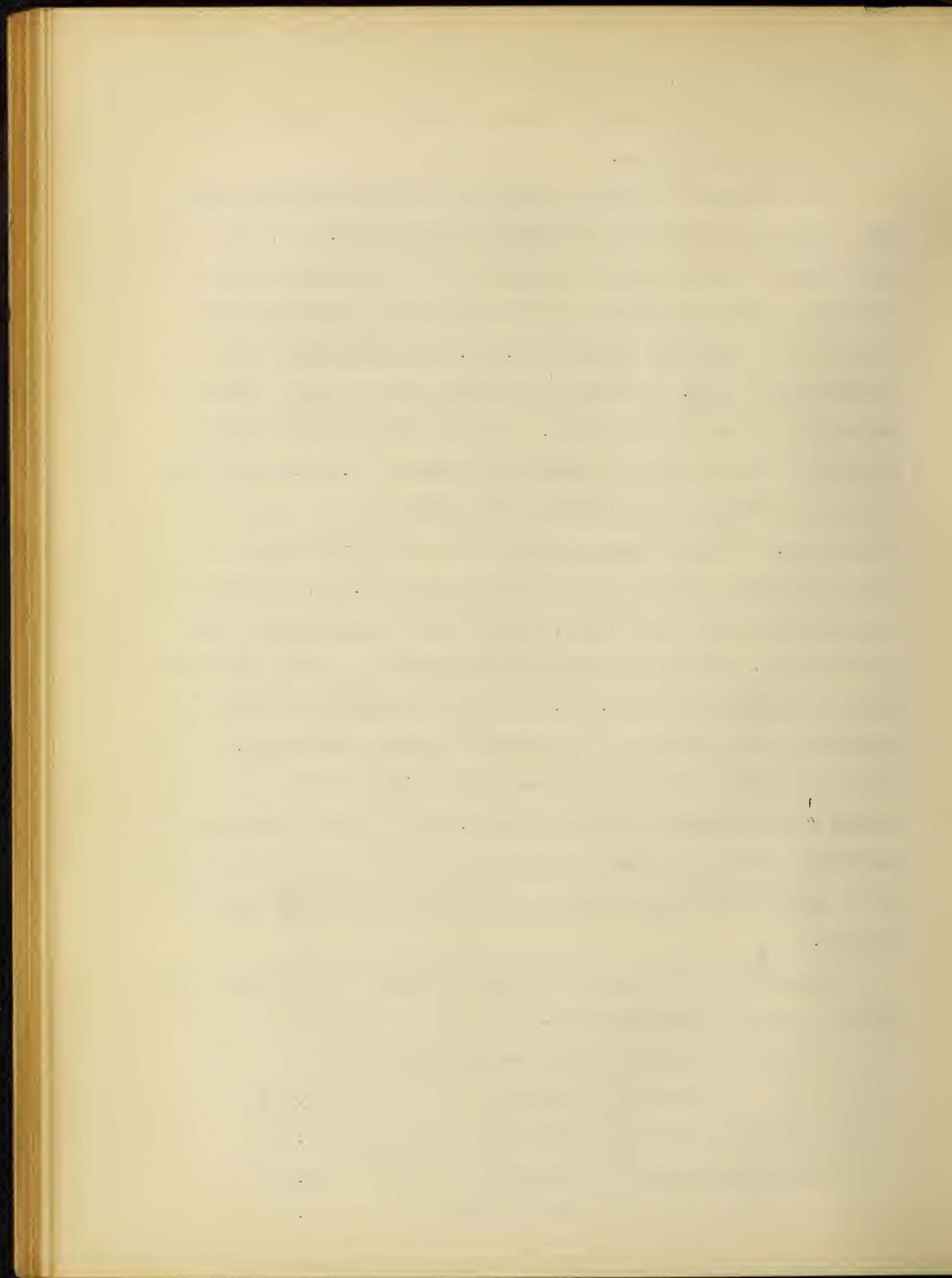
intermediate floor. With this height the use of space is not altogether favorable, from the last stand-point a greater height has proven the most suitable.

Steffenhagen by careful measuring in the University library at Kiel arrived at the opinion that the height of 2.47 m. (the available height reckoned from the upper side of the lower book shelf) is the most advantageous for the economic use of the room which corresponds to a vertical space of 2.3 m. from the upper side of the intermediate floor. The more one exceeds this height, the more extravagant the use of the space. In the Bibliothèque nationale at Paris the normal height of each story measures 2.5 m. and in the University library at Greifswald this dimension is accepted without hesitation. If one wishes to figure out the best economy of space, when the chosen height of each story is over 2.2 m, suitable means of ascending must be provided, among which the steps described later are the best. In the Bibliothèque nationale at Paris the normal height of each story is 2.5 m. and in the University library at Greifswald this dimension is accepted without hesitation. If one wishes to figure out the most economical use of space, when the chosen height of each story is over 2.2 m, suitable means of climbing among which the steps described later are the best must be provided, so that the upper shelves may be easily and comfortably reached.

The height of the stack stories in various well known libraries is given in the following:

Extension of the Archives Library

building at Hannover	2.2 m
Royal Library at Stuttgart	2.25m
Public Library at Boston	2.285 m
Ducal library at Wolfenbüttel	2.3 m



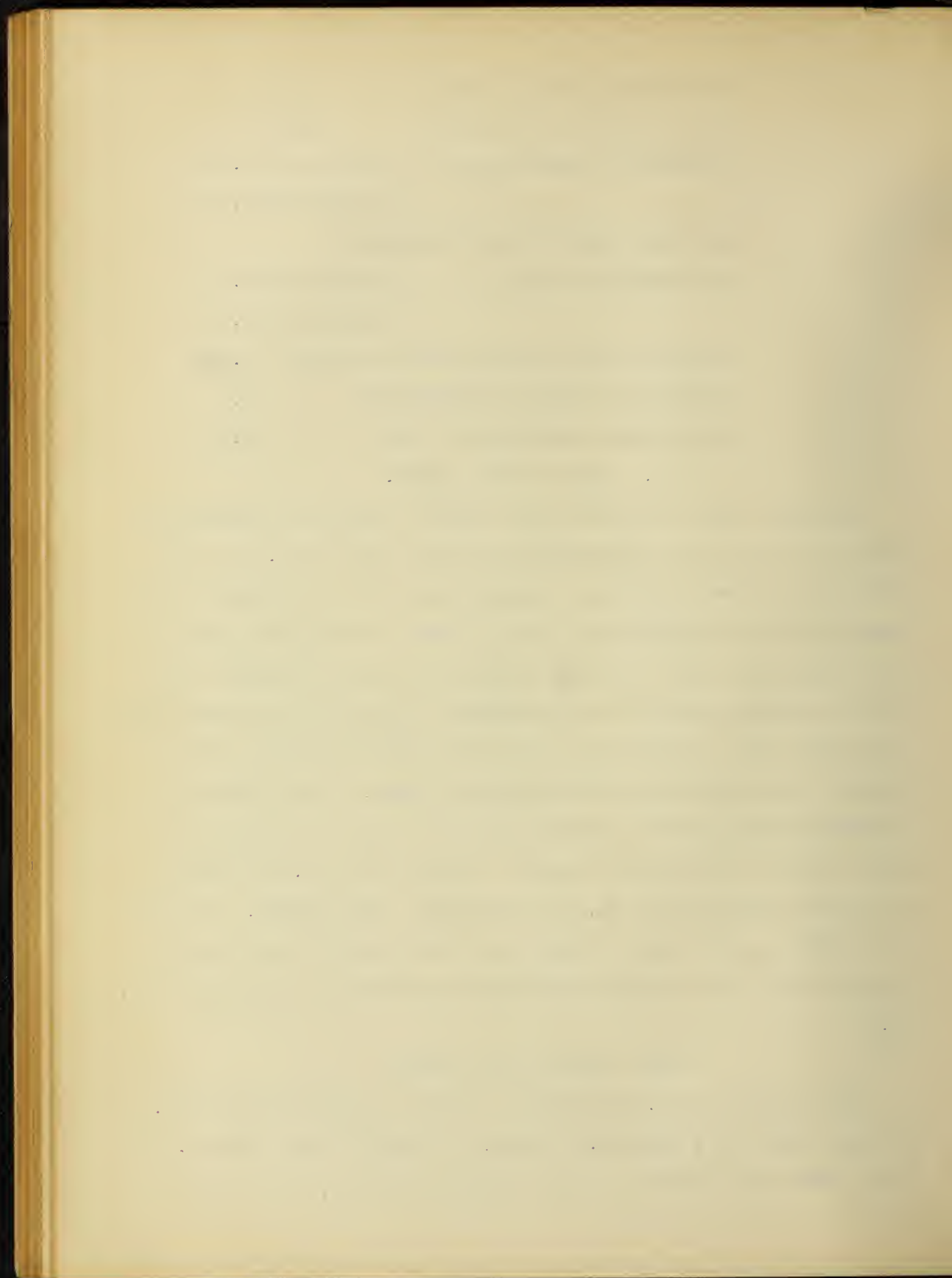
University library at Halle	2.3 m
Royal Library at Stockholm	2.38 m
University library at Kiel	3 stories of 2.4 m
	2 stories of 2.5 m
New stack room of the City Library at Frankfurt-a-Maine	3 stories of 2.43 m
	2 stories of 2.45 m
Library of the British museum at London	2.44 m
University library at Greifswald	2.5 m
Bibliothèque nationale at Paris	2.5 m

59. Depth of the stacks.

The fact that the books need a certain amount of ventilation should be taken into consideration in every stack room. For that reason the shelves are given a greater depth than necessary for the shelving of the various sized books so that a certain air space is left behind the books. In many libraries in order to have a free hand in shelving books, a uniform depth is given to the entire stack, that depth which folios demand. In other cases different depths are arranged corresponding to the different sizes. At the University library at Göttingen for example; where the whole collection has been shelved in individual classes, a depth of 40 cm. for folios, 30 cm. for quarto and 20 cm. for octavo has been allowed. In order to be able to place the different size books on the same stacks a greater depth can be given to the lower part than to the upper (fig. 92.)

60. Weight of the stacks.

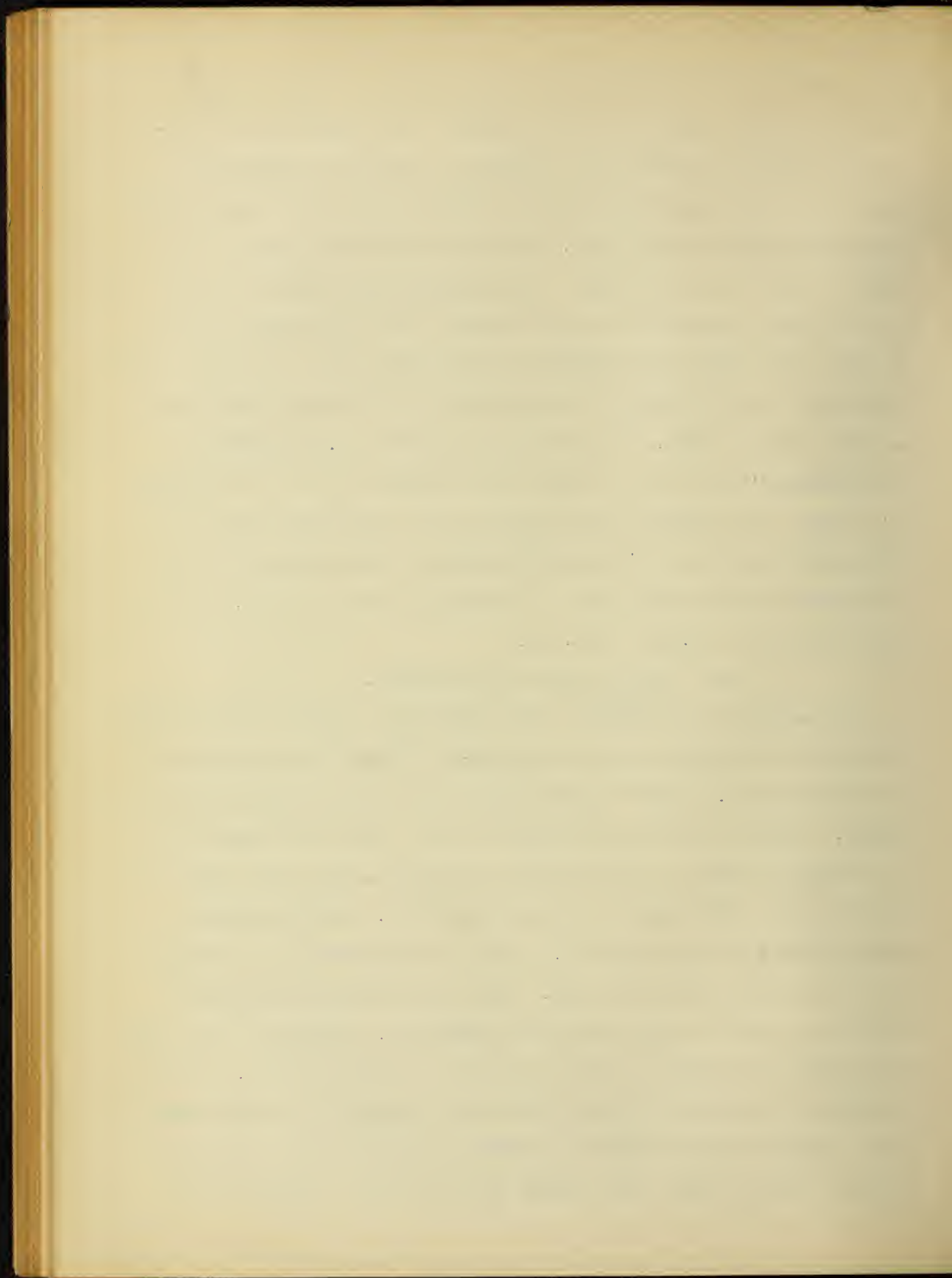
The weight of 1 m. of shelving amounts to about 20 to 25 kg. and the weight of a stack 2.3 m high, 1 m long to about 260 kg. The weight does not increase in case a mixed shelving of all sizes is



decided upon as in the foregoing supposition, but when in reality only the larger sizes are shelved there. For example at the University library at Göttingen according to numerous measurements a weight of 1 cb m of stack which was occupied with the largest sizes was ascertained to be 8 35 kg. and this load is the basis of the construction of the building. Von Tiedemann has made as a basis for statical calculation for the stacks of the University library at Halle the supposition obtained by different lists that the average weight of a book is 6 kg. If the space of the stacks is estimated as half filled, 1 cbm. of space is allowed 300 kg. According to von Tiedemann's opinion a larger use of space is not to be counted on; with a more crowded arrangement it will not exceed this to a very great degree and the somewhat possible overloading is to be calculated with the safe stress of wrought iron at 750 kg. and for cast iron at 500 kg. for 1 sq. cm.

61- Construction of the stacks.

In book rooms of ^{greater} ~~quarter~~ depth the stacks usually receive their main support from the supports which bear the ceiling construction of the book-room. These supports generally run up clear through the stacks. The main construction posts of the stacks are almost without exception made of non-combustible material, the outer walls of stone and the frame work of the stack of iron. For the stacks proper, iron and wood are used. There is no answer as to whether one or the other should be used. From the standpoint of safety from fire, iron is to be given the preference, although it is a well known fact that books in firm bindings do not burn easily. In determining the choice of materials there is usually the consideration whether the book room is heated or not; if such heating is lacking in our climate iron stacks are out of the question. The

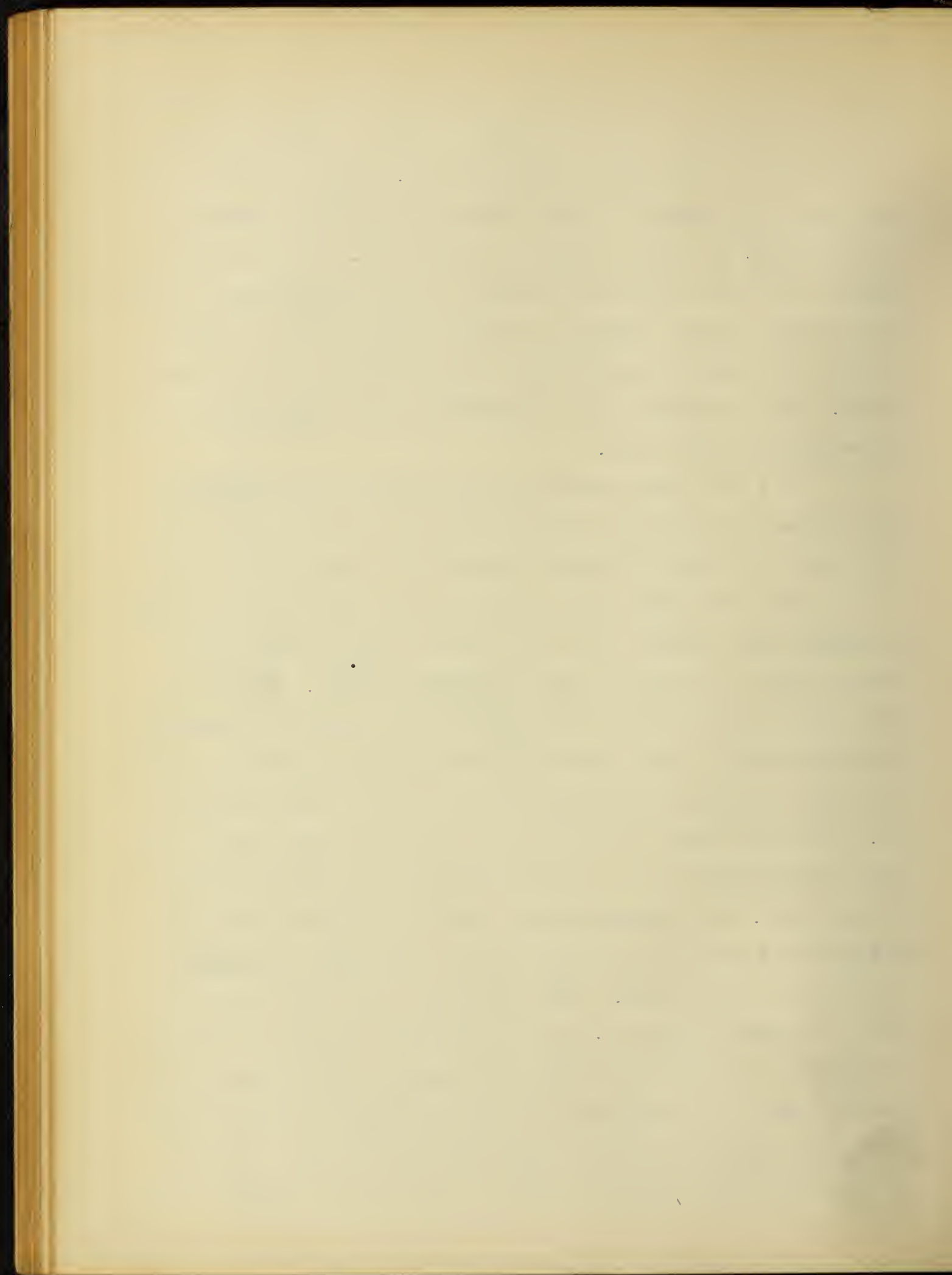


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supports mentioned which constitute the main support of the stacks with the intermediate floors can well be made of wood pillars but to guard against fire they are made of iron. They are either cast iron as in the extension of the library of the British museum at London, in the University library at Halle, etc., or they are put together from angle, T or rolled iron as in the Bibliotheque nationale at Paris, and the library of the New record office at London; in the latter case the cross shaped cross section is to be recommended. The arrangement and construction of the intermediate floors can be managed in two ways.

(a) Iron beams generally are arranged at the height of each intermediate floor so that each story has its own beams and the latter only have to bear the burden of the stacks of one story.

(b) The stacks can be built in one piece so that they run up through many stories; they must then have such firmness that they can bear the weight of the intermediate floors. Often the outer walls of the book room are also used to support the intermediate floors but in many cases the stacks stand quite free from the outer walls, which are then only divided by the stack stories (fig. 93). For such a book room then a hollow hall is built which is divided horizontally by the intermediate floors and perpendicularly by the stacks. The separate closed intermediate floors have been abolished and stories have been erected whose floors correspond with those of other rooms. Every story has been closed above and below by massive ceilings as in the University library at Leipzig. In respect to immunity from fire, the cleaning and the heating for the book room, it is especially recommended that the two or three stories be separated from each other by solid ceilings. In the sanitary stack room cut up by five or six stories, cleaning cannot

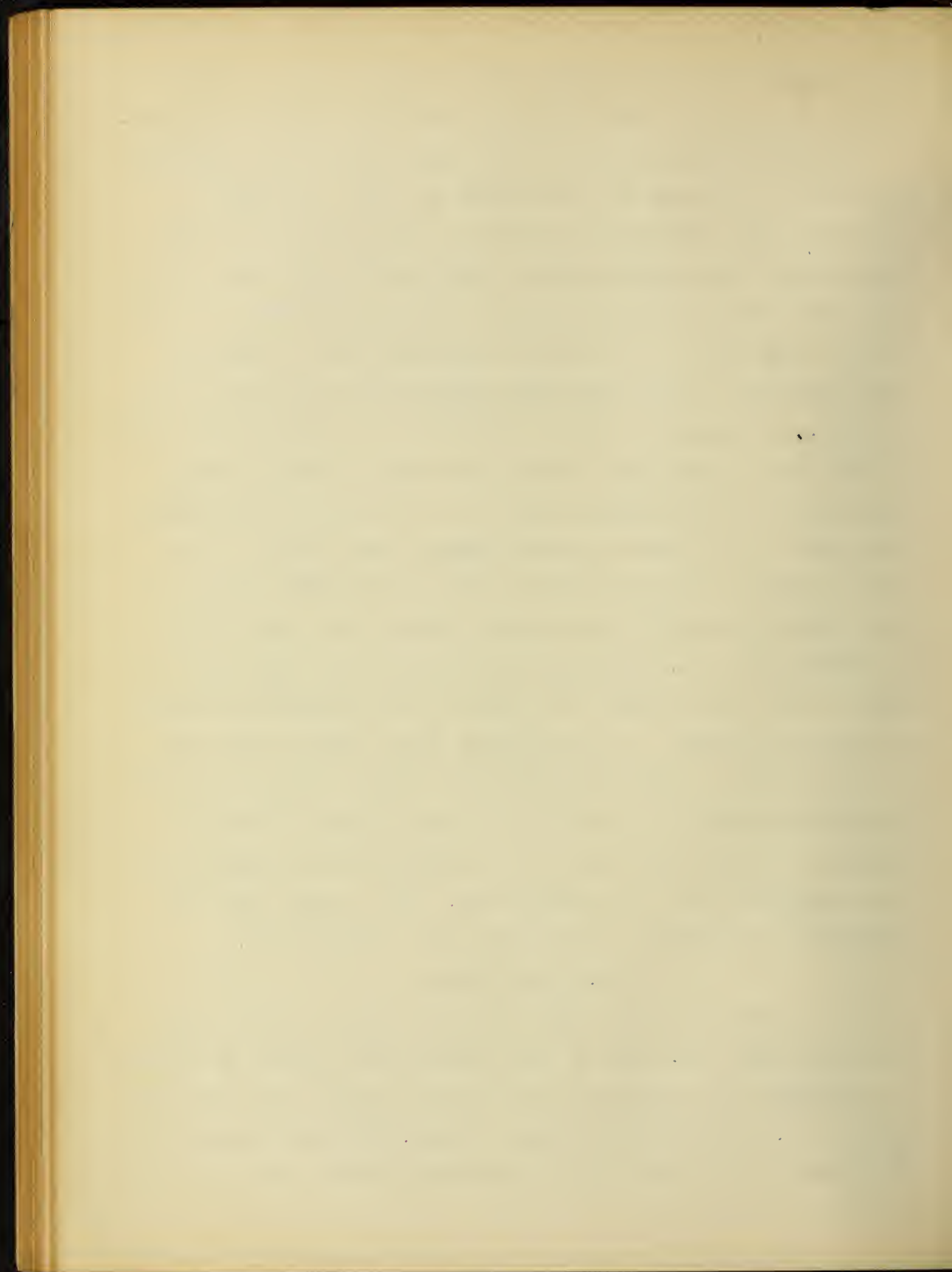


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be carried on with good results since the whole room is in joint bearing and the dirt removed from one place falls down into another.

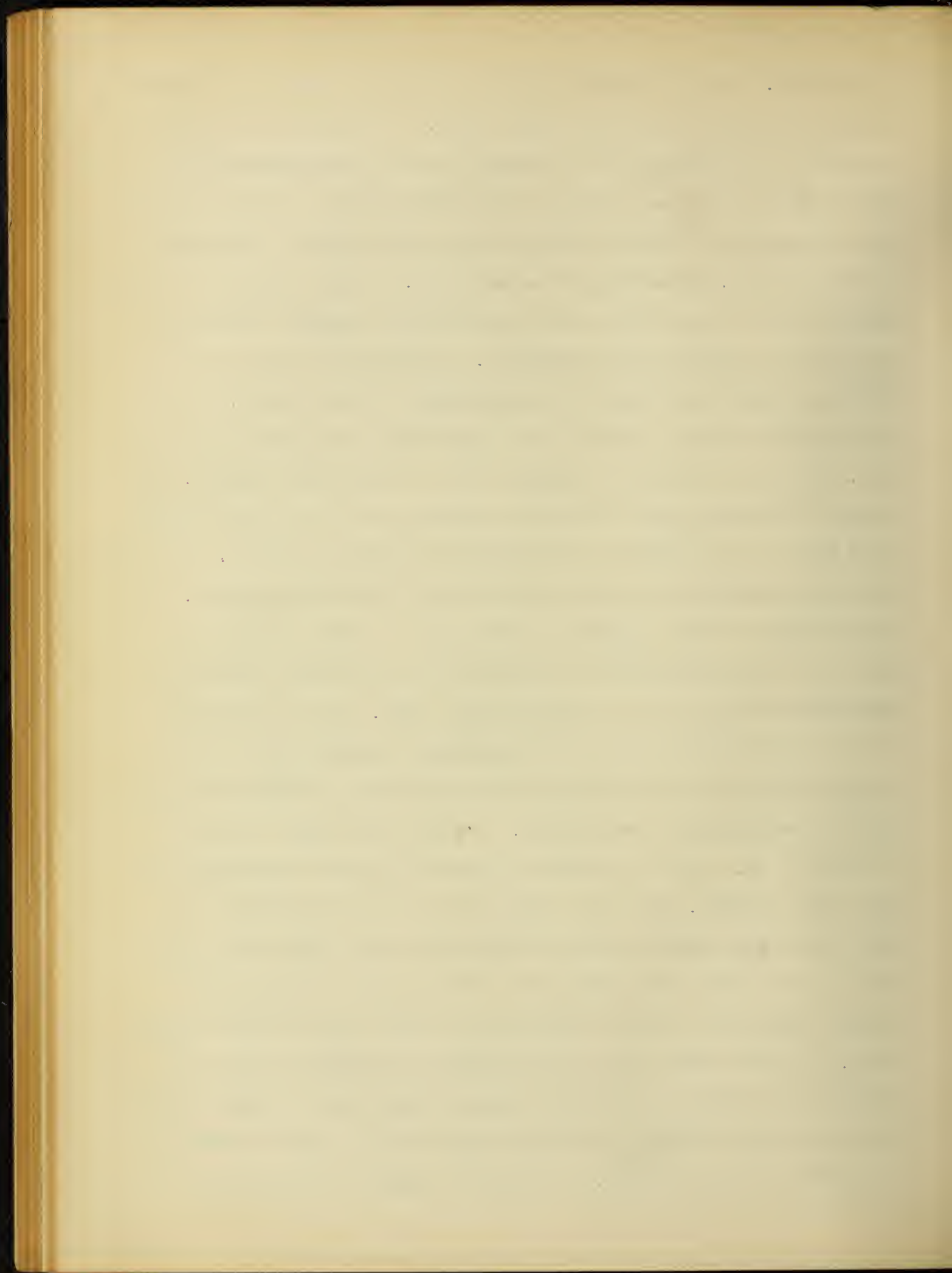
For the further erection of the stacks, first of all uprights are needed on and between which shelves are laid. In order to obtain the best preservation of books it should be seen to, that the surface of the uprights have no projections of any sort which could give occasion for concealing and injuring the books. On this account preference is to be given to polished board or metal uprights avoiding the above mentioned construction materials of wood and iron. If these partitions are low they can be made of firm wood; if they extend through many stories, they must be made of strong framework with corresponding panels. In this way the wrought iron stack walls can be given a greater firmness from bending so that they can support two metal shelves which are fastened together by steel bolts as is done in the new book rooms of the city library at Frankfurt-a-Maine. It has already been shown that care must be taken in the book room that the system of ventilation be hindered as little as possible. On that account closed backs to each row of books as well as cases with doors and curtains are to be avoided. The question whether it is best to let the uprights of the stack extend to a rather great height will be decided from a purely practical standpoint with wood construction. With a small axis, the equipment of the stacks is to be taken into consideration.

62. Book shelves.

The shelves are usually made from wood and are either simply cut from planks 3 cm. thick or are framework with panels, an example of the latter is at the University library at Halle where the frame is 2 1/2 cm. thick and the panels, 1 1/2 cm. Construction with frame and panels is to be sure the most expensive but the most worthy rec-



ommendation. For the shelves a kind of wood is always to be chosen which is less effected by the wood worms. In respect to the last condition, the proposition is generally made to bore through the shelves or to put them together from single planks, not one laid on top another, or to overlay the top with metal sheets, thin plates of glass, slate, porcelain, stone ware etc. These precautions are superfluous as long as the care exercised for repeated cleaning of the stacks is abundant and extensive. Painting the shelves is not demanded implicitly; when it is done select a light color. In that way cleaning is aided and also the lighting of the room is beautified. Often other material besides wood is chosen for shelves. The stacks of the New record office at London as well as those of many other English and American libraries have shelves of slate, 2 cm thick, which are covered on the top with oil-cloth or other material. Shelves made of crude glass are also used. These as well as slate have the disadvantage of sweating in the sudden changes of temperature which is very injurious for books. In the new book room of the library of the British museum at London, the shelves are made from sheet iron which is stretched over a wooden frame and they are covered with red leather. On the front edge a strip of oil cloth 5 cm. wide is fastened to prevent the dust entering the next lower row(fig. 94) Sheet metal which is laid in frames of Angle or Z iron adapts itself to making shelves, these are always covered with some kind of material. The shelves are given for breadth sometimes half and sometimes the whole depth of the double stack. In the former case one can place the shelves on the two sides of the stack at different heights independent of each other and in that way obtain a comfortable handling of books as well as an economical use of space. In many new plans this advantage is

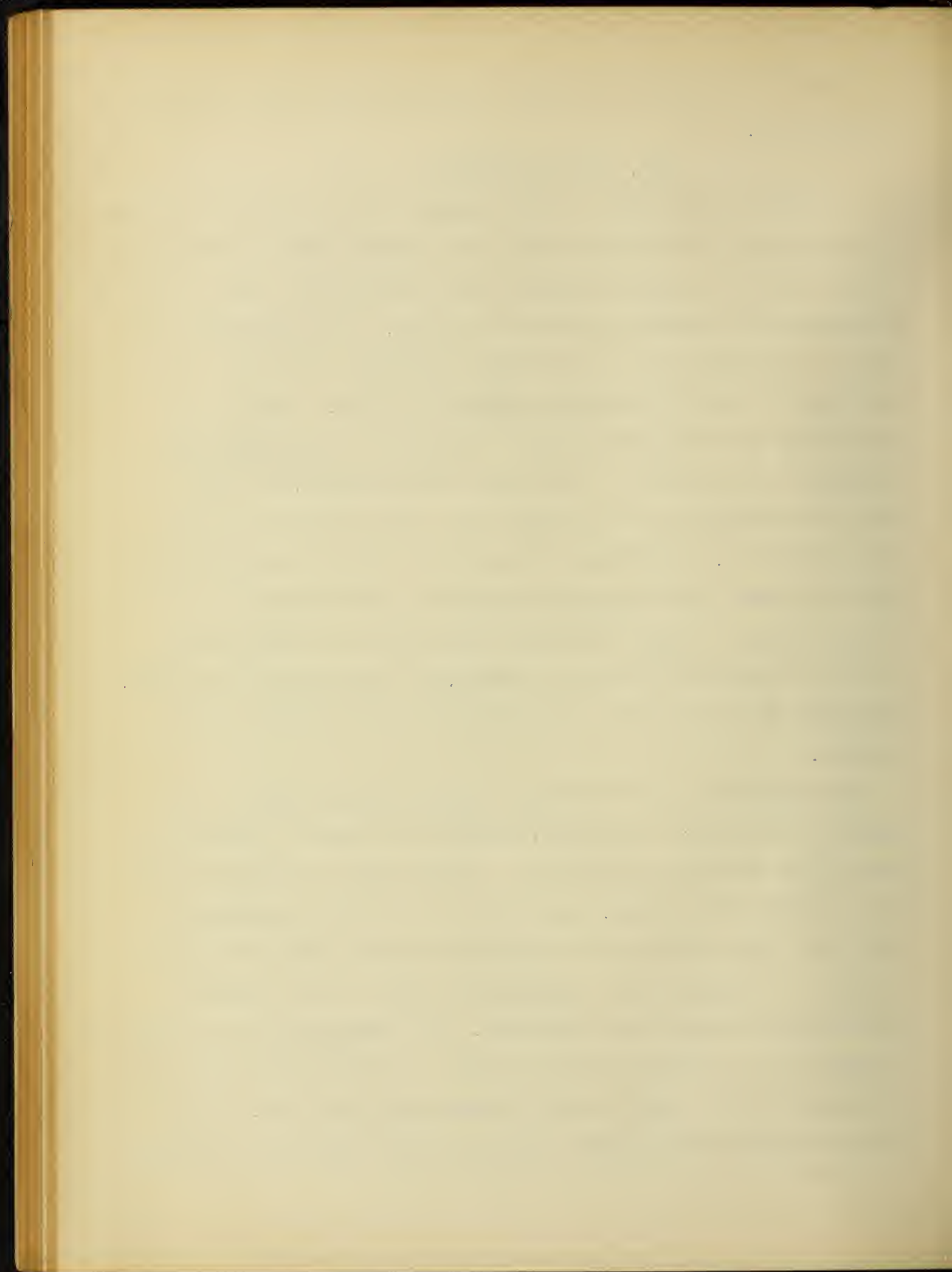


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considered of no value as it makes the construction more difficult and expensive.

63. Shelf adjustors.

In order to undertake a slight change in the height of the books of the same size, that is to change the distance between shelves and to have the hand as free as possible for the proposed change, it is recommended that moveable shelves be erected. For readjusting the latter, adjusting pins are used which were first introduced in the new library room of the British museum of London. Such an adjustor (fig. 91) is provided with a shoulder on which the shelf can rest; this shoulder is constructed eccentrically; for this reason the adjustor can be arranged in a position of one or the other of 180 deg., the shoulder placed and with it, the shelf moved higher or lower. The adjustors selected for the library of the British museum at London are placed in a series of holes with an interval of 19 mm from center to center; by the rotation of 180 deg. difference of 17 mm height in the position of the shelves may be obtained.

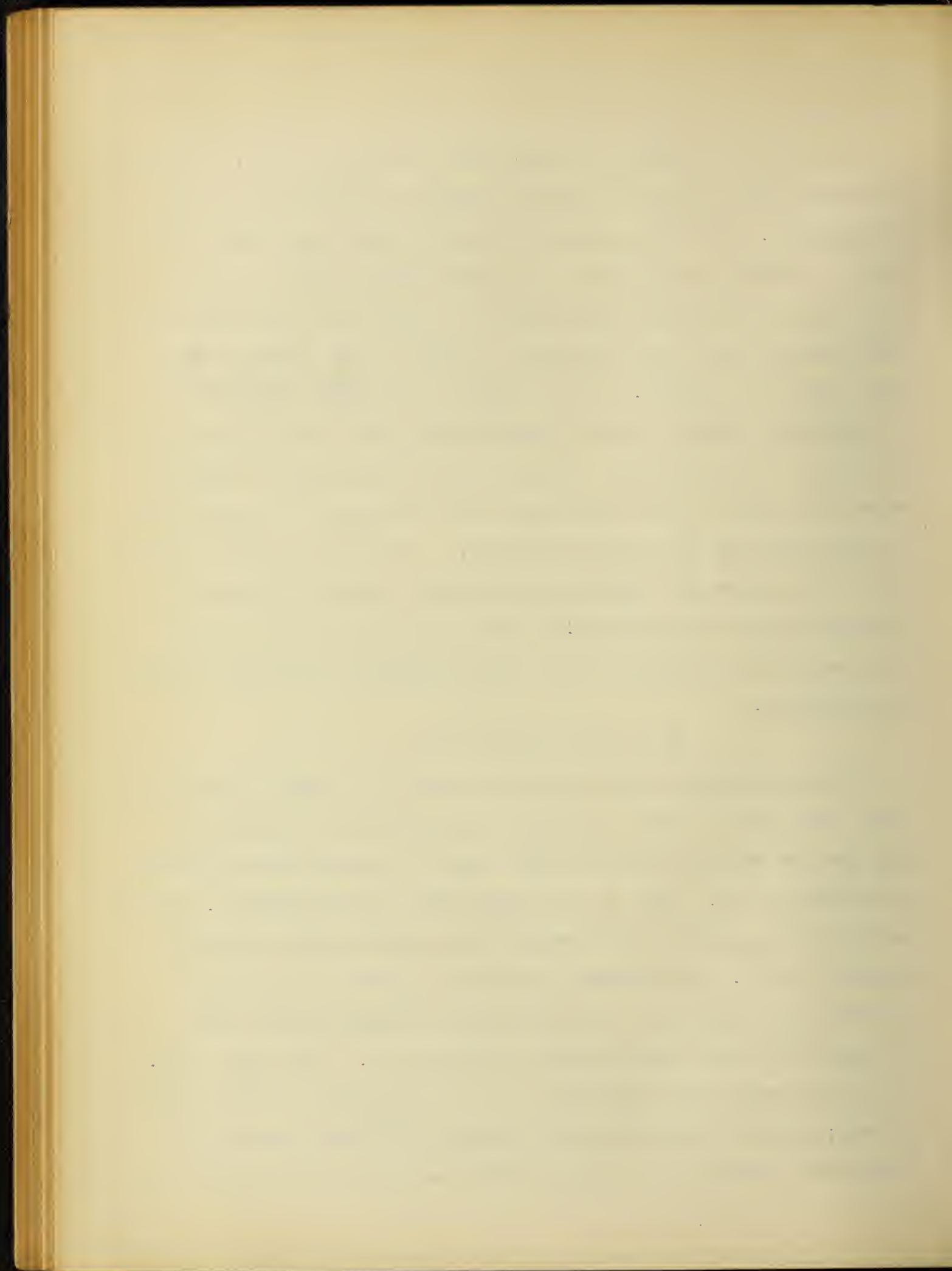
The adjustors are of different shapes, the outer end of the adjustor is sometimes ear-shaped; the ears can then be placed horizontally or vertically so that the slight change of length desired can be easily accomplished. Each shelf rests on four adjustors of some kind, which are placed in the stack uprights about 4 cm from the edge. The uprights are considerably weaker by the necessary boring which is rather close together. This weakness and the danger of splitting is lessened if these borings are made in two rows above one another and the holes in the two rows are alternated. It is better if an inlaying of sheet iron or of hard wood which can stand



boring, be used. In fig. 96 is given a cross section of the cast iron uprights which form the main support of the library of the British museum at London; this shows such inlaying of wood. The good arrangement used in the University library at Göttingen is given in figure 97. Here iron plates, 25 mm. wide and 2 mm thick, which bear the borings, are in laid. In other stacks instead of this, hard wood is used which makes possible a deeper and more economical construction since iron expands as a result of the numerous holes bored under one another. In the library of the News record office at London the shelves already selected from slate rest on angle iron of 30 m. m. length (fig. 98) which rest in their turn on adjustors which are placed in holes existing in the uprights, the angle iron is then placed on top of the adjustors. In order to avoid knocking the books against the adjustors, the latter are to be fastened to the under side of the shelves! So that the incisions need not be too broad it is recommended that only one row of the holes be bored for adjustors.

64- Grooved strips etc.

In old libraries grooved strips as they now appear in small book cases were used to adjust shelves. The shape and arrangement of such grooved wood are familiar, but there are several disadvantages connected with it. That is the reason that in new libraries, grooved wood has been rejected and recently the adjustors just mentioned were put to use. Later Ebrard and Wolff returned to the use of grooved strips after they had changed and remodeled it in such a way that the former inconveniences were removed. The walls (fig. 100) of the cases were provided on both faces with uniformly placed grooves; grooved strips were also placed in the same way on the longitudinal sides in an upright position. The latter project from

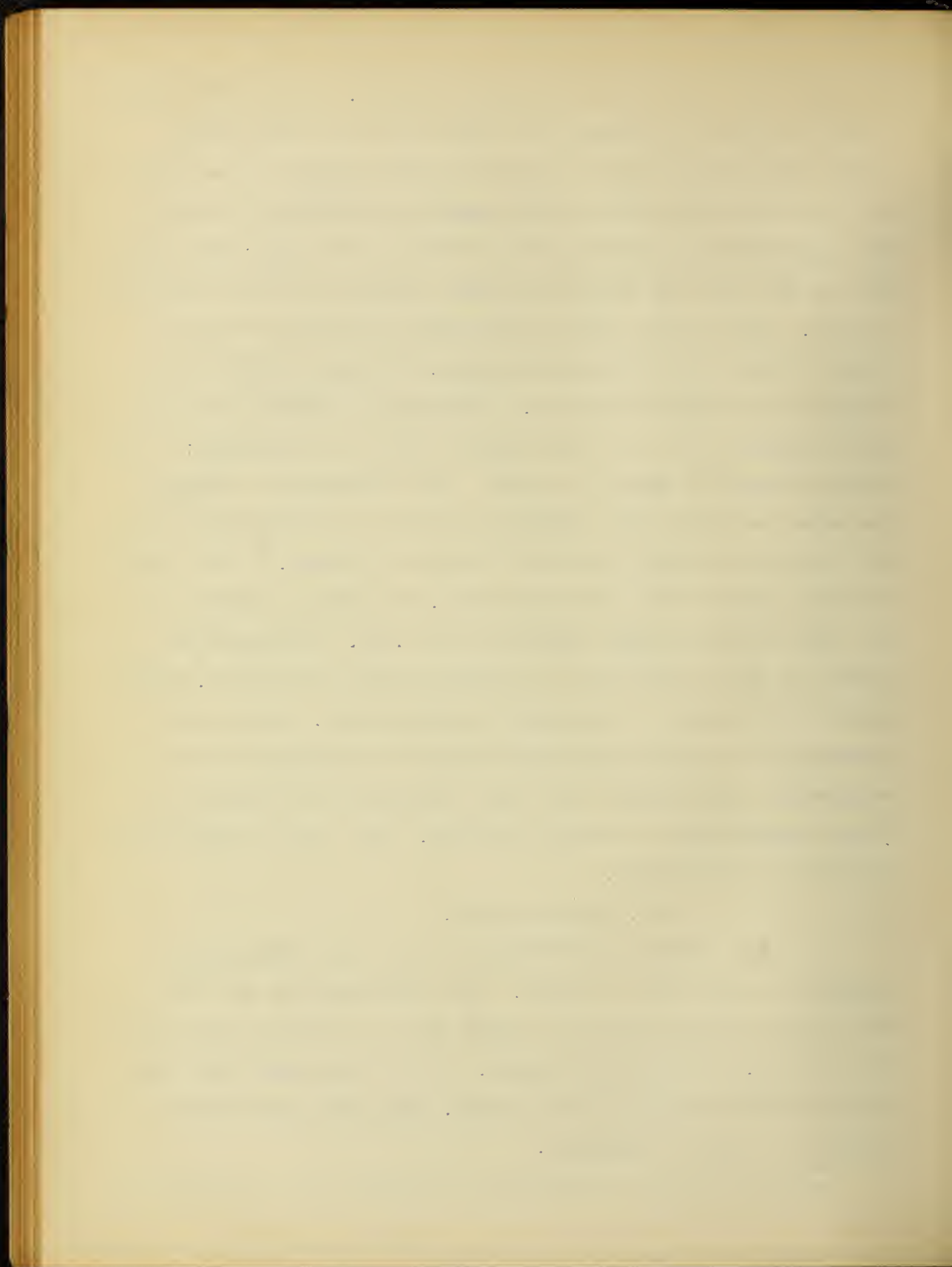


the wall, the rest of wall is perfectly smooth. At the end of each shelf are placed iron pegs at the back and front, which are so shaped and adjusted that one peg lies in the notches on the front of the stack and the other in the grooves of the central strips. Each grooved strip serves for two divisions of the case; each front one for the two lying beneath and each central one for the two back to back. The pegs are either secured into the shelves or special pieces of iron are constructed for them. The pegs are from 22 to 32 mm. distant from one another. The height or depth of the shelf can be changed in a very simple manner with this arrangement; it is never necessary to remove the books. This arrangement is used in the extension of the city library at Frankfurt-a-Maine, and in the new book stacks in the University library at Giessen. In the former the front grooves are of cast iron (fig. 99) and are fastened to the iron uprights already described in Art. 61. In Giessen the stacks are made of wood and the grooved strips of beechwood. Often grooved iron strips are fastened to wood uprights. Finally the arrangement in the new University library at Amsterdam is to be considered, where grooves into which the shelves are slipped are formed transversely at uniform distances. This mode of construction is not to be recommended.

65. Other details.

In double stacks, the books must be kept from being pushed through from one side to another. For this purpose at the rear of each shelf a strip of metal or a small piece of wood of 4 cm height and 1 1/2 cm. thickness is fastened. In the two London libraries woven wire is used for the same reason. The first plan has the advantage of greater cheapness.

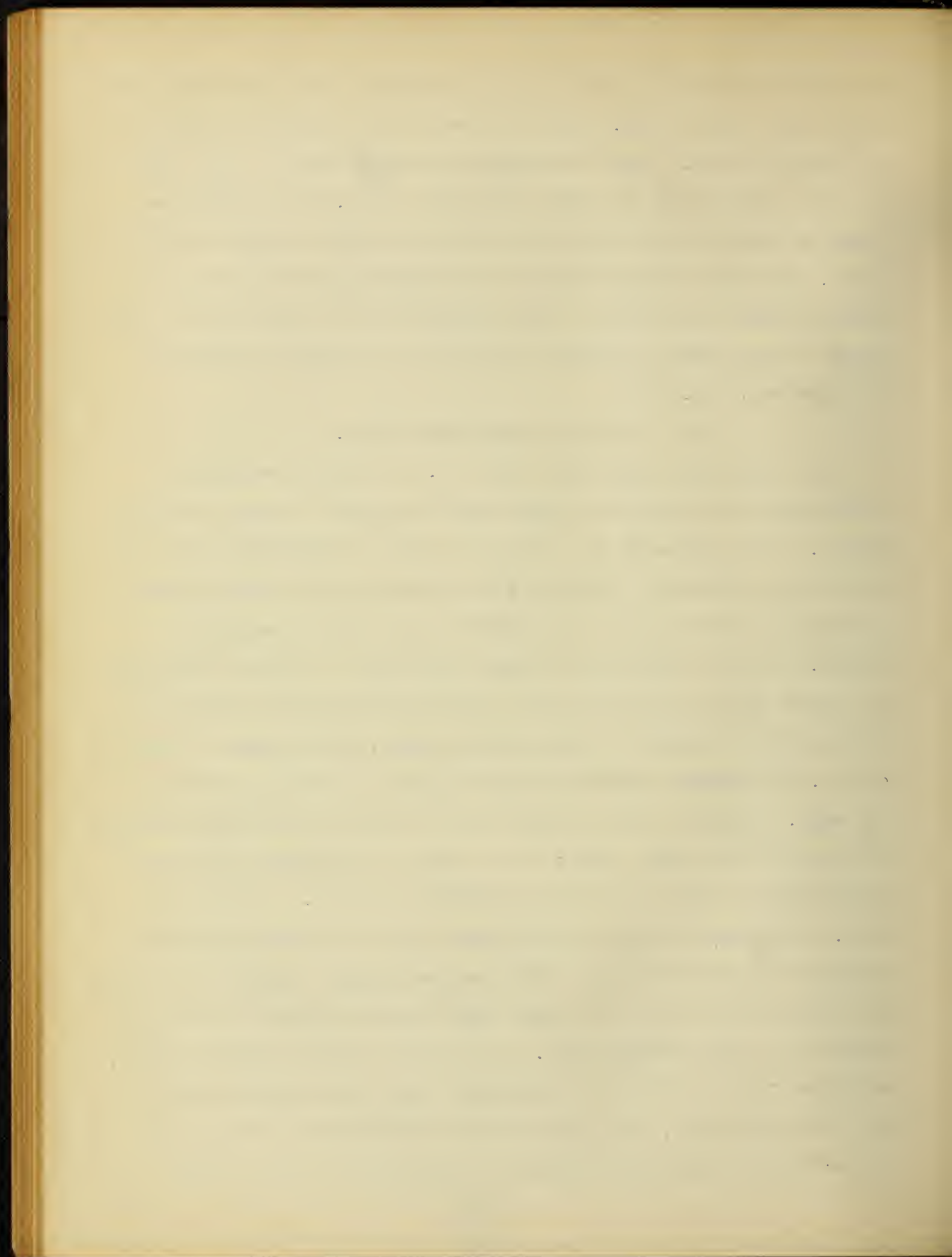
In order to keep the books from falling down in a row which is



not entirely filled or in which great gaps are left from taking out book, book supports(fig. 103) which were first invented in America are suitably used. These are formed of strong zinc in  form and their broad part is pushed under many books. It is often desired to consult immediately books which have been taken from the shelf. If in the aisles between the stacks tables or cases are placed, these can be used to put the books on; if such are not provided in some cases the desired end can be obtained by different size shelves.(fig. 104)

66. Stacks for over sized books.

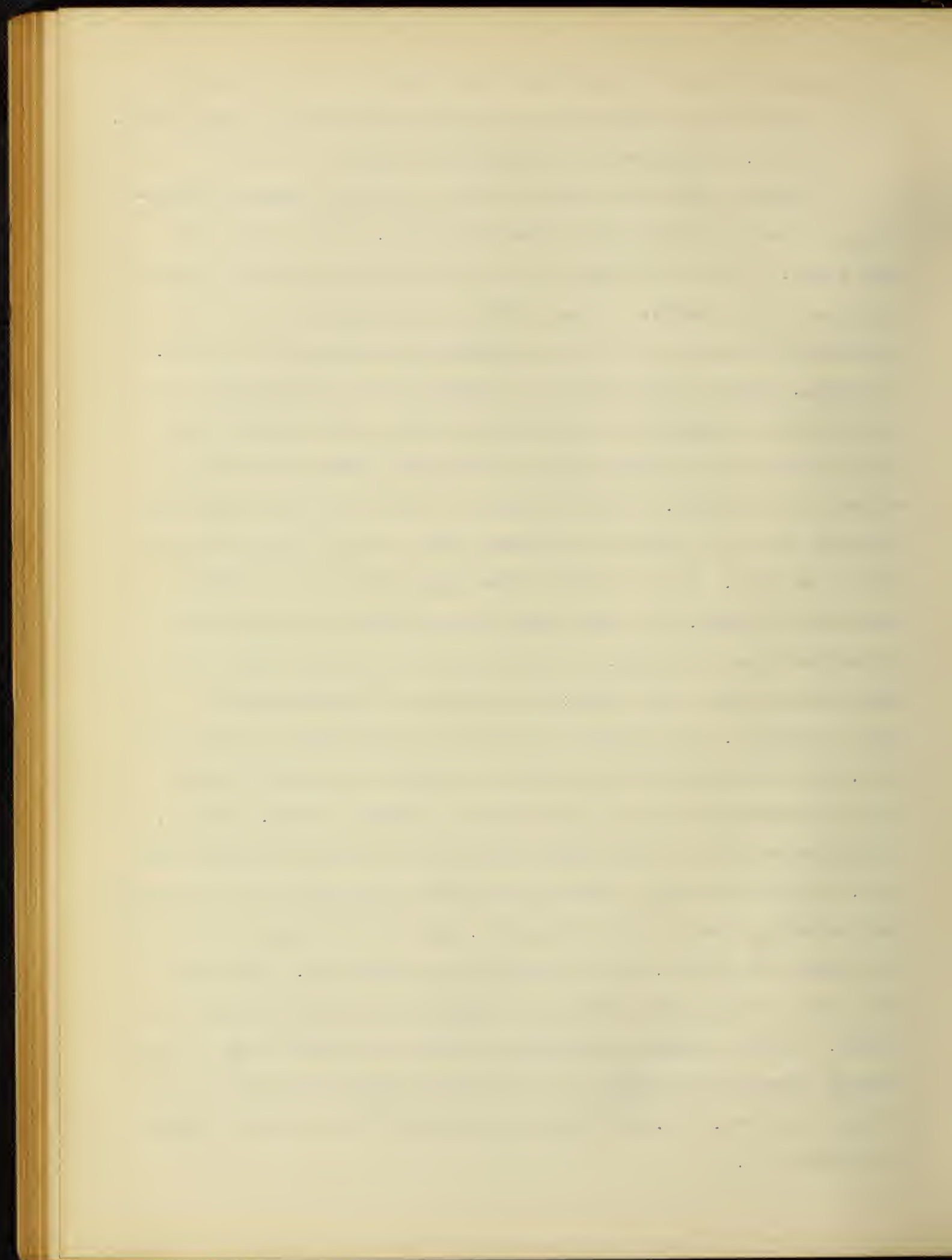
For unusually large books (see art. 51) special stacks are constructed which are best placed near the group to which the books belong. In fig. 105-108 are given the various arrangements which are used in the University library at Strassburg, in the Bibliothèque nationale at Paris and in the library of the British museum at London. In the library first names opportunity is given to lay down and stand up the oversized books. The partitions being near to one another make it easier to take out the books. In the plan at Paris in fig. 106 movable shelves (b) are arranged which are grooved at the edge. Strips (a) are slipped into the grooves which are fastened in the side with brass tacks; in the rear of the stacks, doors are constructed to keep the books from falling through. In the plan (fig. 108) used at London to the under side of the shelf, supports of strong zinc are fastened between which upright volumes are slipped. Here partitions to keep the books from falling through are not provided as is done in Strassburg. If the axis of the stacks is large, suitable place is afforded in the aisles for the placing of cases for oversized books, as is done in the Bibliothèque nationale at Paris and the University library at Leipzig (fig. 109) In other



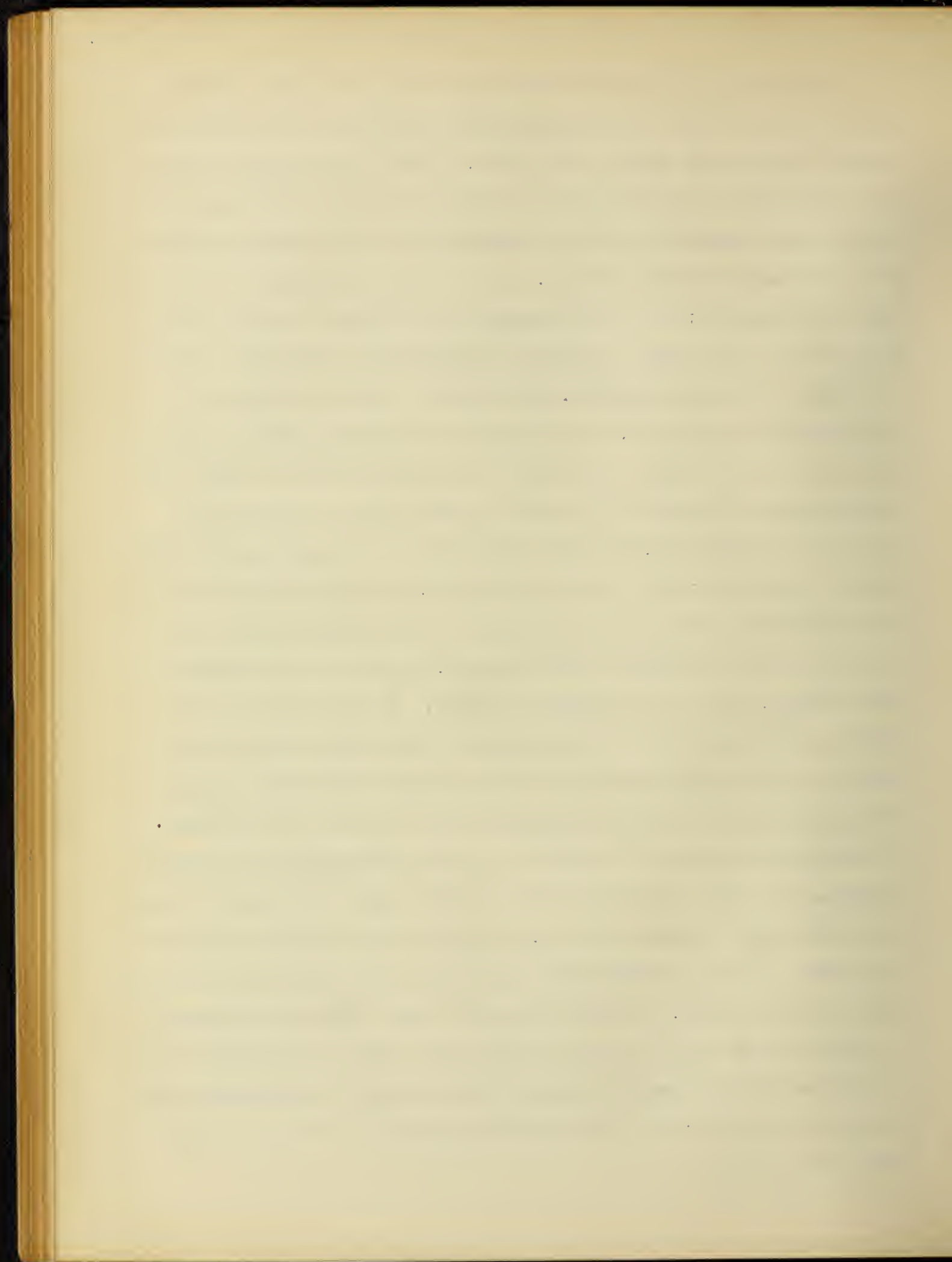
cases as for example in the University library at Göttingen the cases in question are placed in the central aisles of the book rooms.

67. Galleries and intermediate floors.

In order to make one-storied stacks accessible either projecting galleries or intermediate floors are used, as has been said many times. Whether the one or the other shall be used depends on the axis of the stacks. If the latter is considerable as a rule galleries are chosen; for this a breadth of at least 80 to 85 cm. is needed. Smaller galleries do not permit one to stoop easily or comfortably in taking out or arranging books. The galleries are usually built by the projection of horizontal beams which are inserted in the stacks. At the free end of these beams railings are fastened which can never be dispensed with and must never be less than 90 cm high. In the smaller book rooms of the Bibliothèque nationale at Paris, the wood stacks are provided with projecting galleries 85 cm wide (fig. 11) These have wood floors which are supported by projecting beams; the latter are strengthened by iron strips (fig. 100) The way the railing is fastened is shown in (fig. 111) The construction of the galleries in the book rooms of the University library at Göttingen is shown in figs. 112-113. The galleries rest on wood beams which are laid on the stacks under them, to diminish their construction height these beams are strengthened on both sides by iron strips (fig. 113) In the floor of the gallery along the stacks, narrow openings are left (fig. 112) which are of the greatest importance for lighting the upper rows of the stacks. To keep people from stepping through and books from falling through these openings, they are surrounded with iron railings and covered with net. Fig. 114 shows the gallery of the public library at Malden (N. A.)



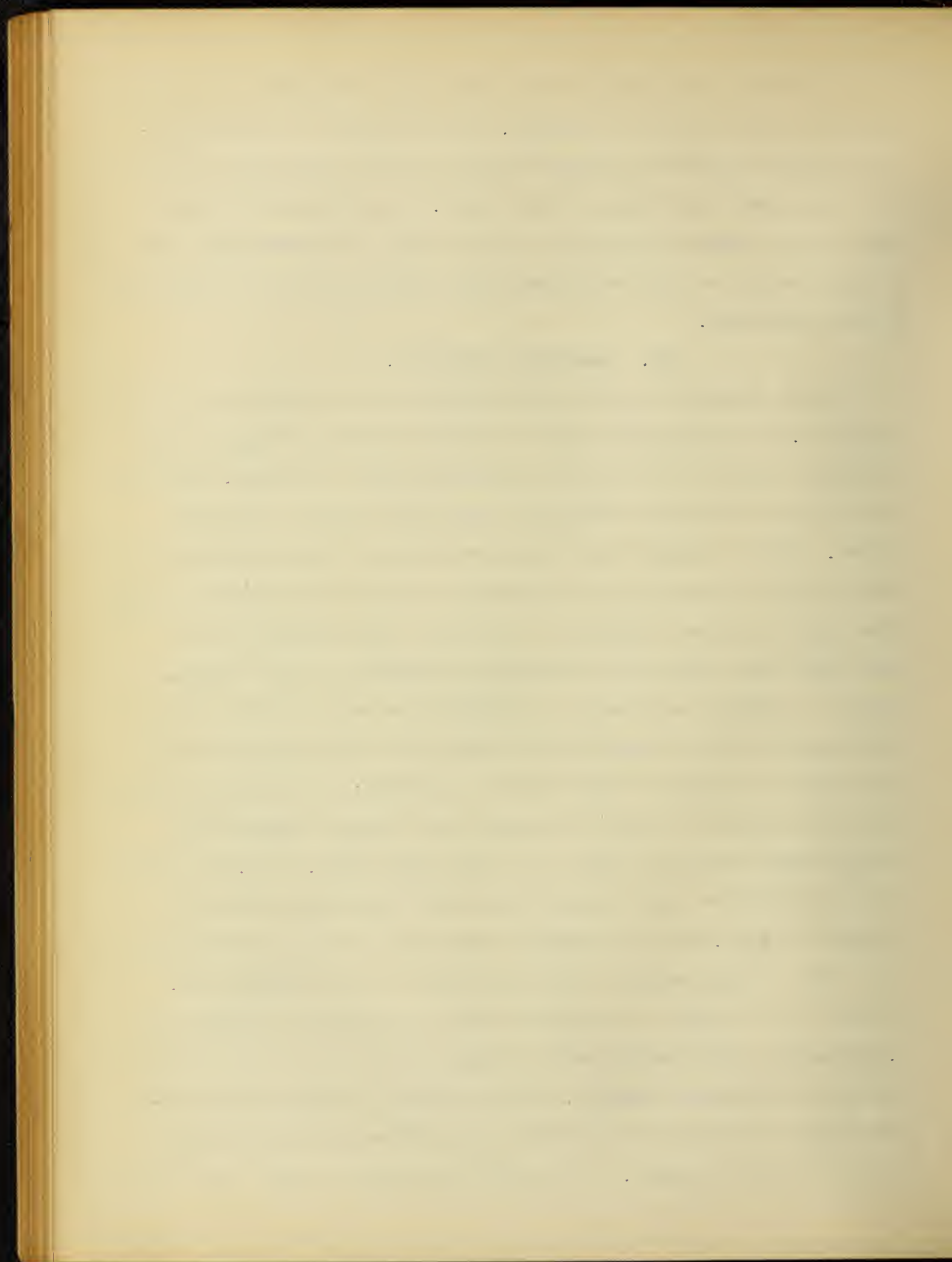
Intermediate floors are constructed with or without light shafts and the latter are an imperative necessity if the stack is lighted entirely or partly from above. These intermediate floors are constructed in the simplest way as has already been shown from wrought iron framework which is constructed of iron beams generally of I or T shaped cross sections. If it is not necessary to let the light pass through; on this framework may be placed plank floors, metal posts, sheet metal or floors are formed of steel and concrete or gypsum and wire netting. Interrupted floors are generally constructed of cast iron. The shape of the light shafts is usually immaterial if the light only comes from skylight. But if light from the side also falls here, they must be long and run parallel to the rays of light (fig. 115) This direction is the same as the aisles between the stacks; this is also of advantage for the reason that it is uncomfortable to go at right angles to the openings, the point of the shoe often catches in the opening. Instead of interrupted metal plates, crude glass plates are used. If the light for the stacks comes entirely or for the greater part from above in many cases it is not only necessary for the light to penetrate through the light shafts in the intermediate floors but as in the library of the British museum at London and in the Bibliothèque nationale at Paris, for good results the light shafts must be arranged along the stacks with a width of 27 cm. In Paris hemp mats are stretched over them, in Halle, woven wire to prevent a misstep or to keep books from falling through. In later plans the light shaft has a breadth of from 18 to 30 cm, with such breadth the danger is increased that the persons who are working in the stacks through carelessness may fall and be injured; for this reason railings are erected which remove this danger.



A peculiar arrangement to make the stack accessible is carried out in the City library at Cologne. At the height of the intermediate floor constructed elsewhere little sliding seats are fastened which run along the stacks on iron rails. With the use of these, there is the special advantage that the light is considerable, yet a result nearly as good and perhaps more comfortable can be obtained by iron galleries.

68. Ascending apparatus.

It has already been shown that as soon as the height of a story exceeds 2.2 m, arrangement must be carefully made by means of which the upper shelves may be easily and comfortably accessible. Generally rods are used which are arranged at the proper height along the stacks. These originated from the protecting railings described above, first in the University library at Leyden where these railings were given a greater dimension so that one could stand on them. Later they have added to the supports or uprights of the stacks, handles or ring to hold to in climbing on the rod. (see fig. 109) The height at which these rods are placed must not be greater than the height of the base of the stack in question; at a greater height the lower shelves in which the largest and heaviest volumes are placed cannot be easily taken out or put back again. Fig. 116 gives the arrangement of such rods as is carried out in the University library at Halle. This consists of a gas pipe of 27 mm diameter laid in a kind of iron bracket, which is secured to the wood upright. As long as the height of the story does not exceed the average of 2.35m one can comfortably reach the upper row by use of the rod and can do the necessary cleaning. But, however, as soon as the average height is exceeded the rod will not suffice and one must plan for other ways of ascent. It has been proposed to screw iron steps



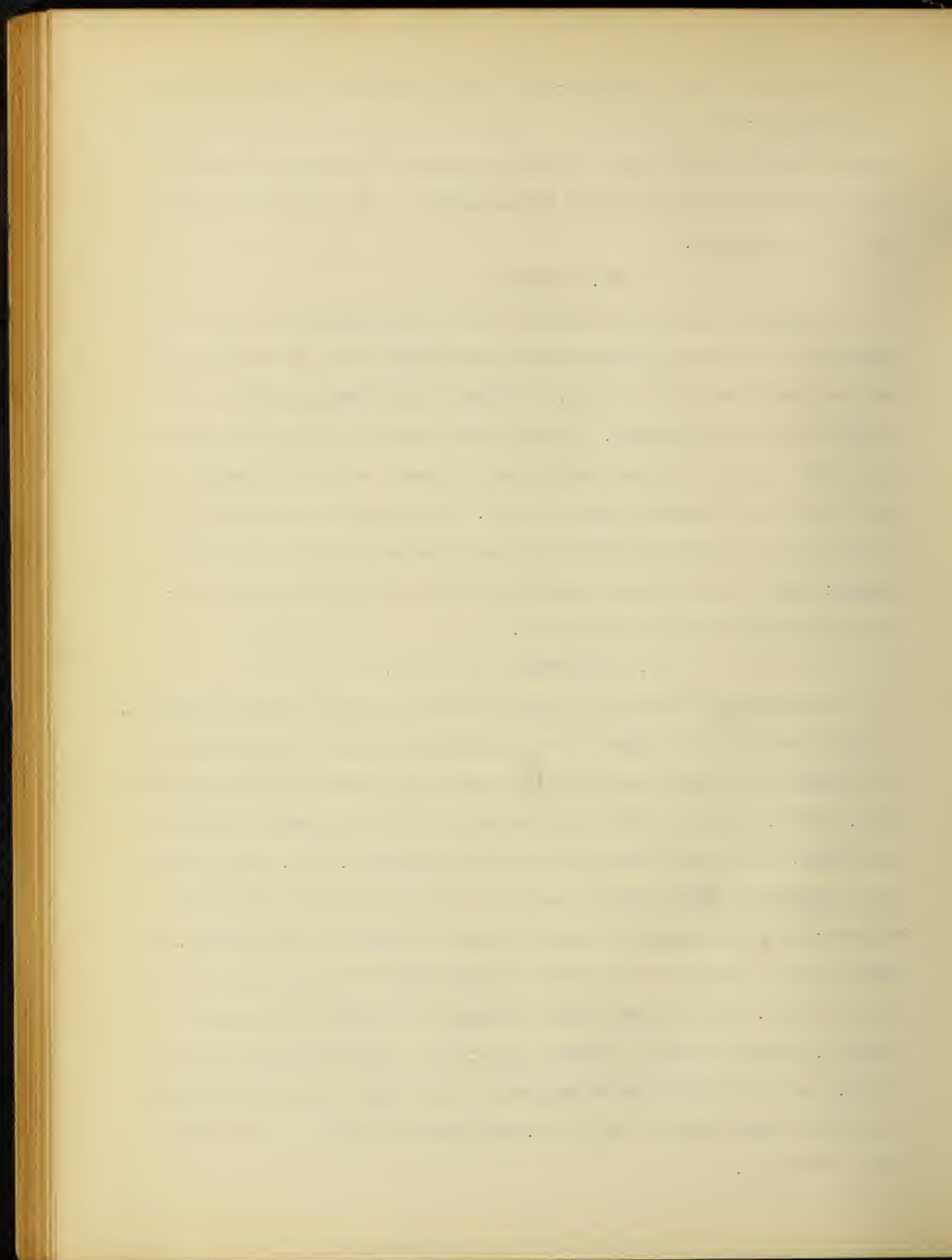
to the uprights above the rod; but usually movable steps are used as in Bibliothèque nationale at Paris or the library of the British museum at London(see fig. 117-18) So that such constructions can move easily on the iron floor there should be no projections or feet at the bottom.

69. Signs.

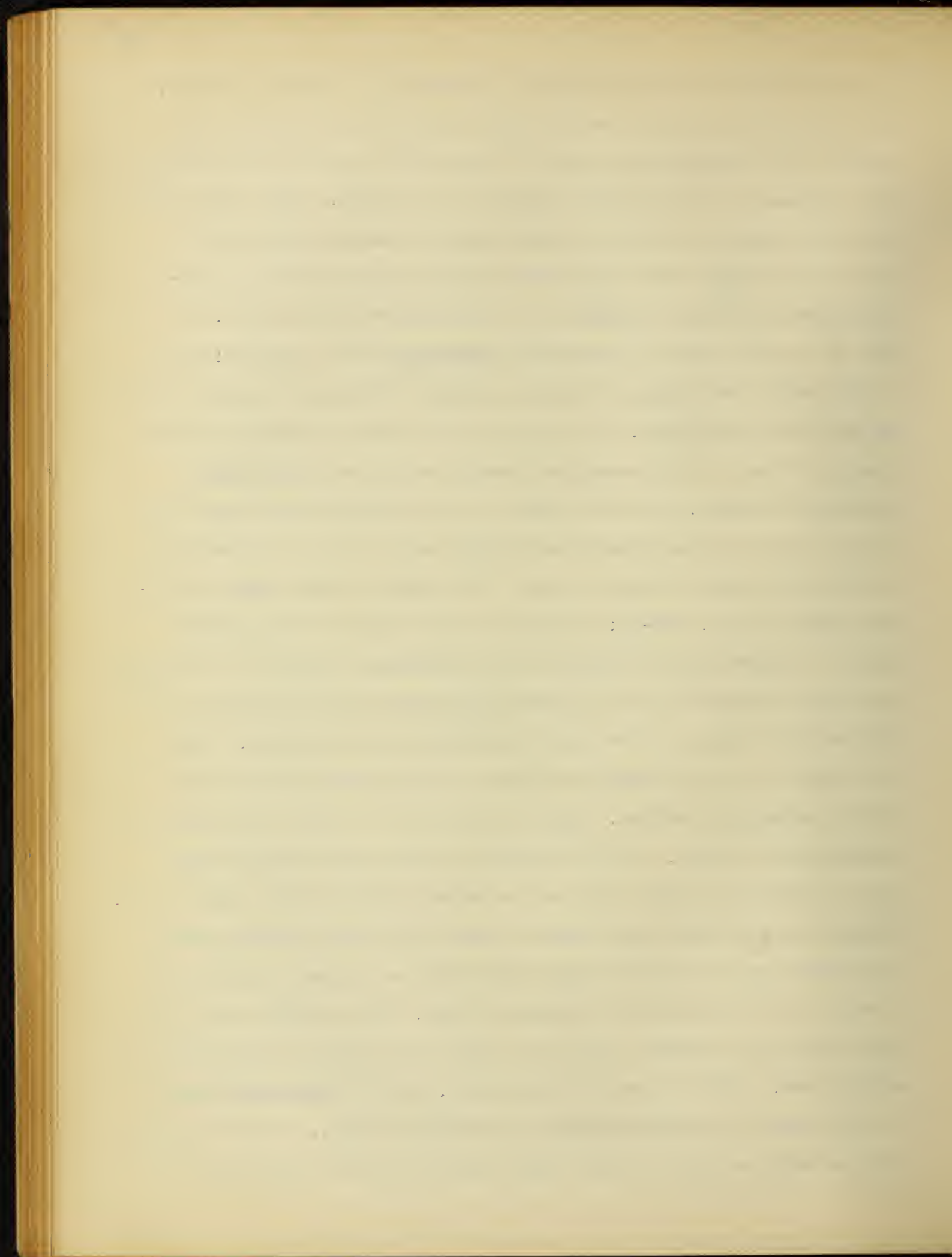
To safely and easily ascertain ones surrounding in book rooms especially in those libraries which the staff does not exclusively use, as has already been said, distinct labels and notices are to be fastened to the stacks. Special consideration should be taken in the construction of these and suitable space should be left at the eye height for posting these labels. They are best made of loose cards slipped in tin holders(these are pieces of tin bent at the edges); they can be easily taken out when books are added or arranged or their positions changed.

70. Stairways and lifts.

Stairways are used in no small number to join separate stories. In the stacks of the library of the British museum at London they are placed at intervals of 12 m. In the University library at Griefswald, Halle, Kiel and Göttingen as well as in the Royal library at Stuttgart, the city library at Frankfurt-a-Maine, etc., the stacks are interrupted by a middle passage in which the stairways are erected; in this room it is easy to move around in the stacks. The number of stairways to be erected depends upon the available number of the staff. The stairways must always be erected in straight flights, special stairs prevent haste; but they need have no great width. In the Bibliothèque nationale this width measured between the balustrades amounts to 55 cm. and this average is considered fully adequate.



According to the requirements and methods of administration, small book lifts as well as passenger elevators are constructed. Whether the construction of one or the other kind of lift is desirable depends on the available number of the staff. Hand lifts which are to be used for raising a slight load of books, demand with their construction that each story passed through should be provided with a special attendant who should serve at the lift. If such is not the case the intended lightening of the service; that is the swift discharging of orders and the avoidance of stair climbing can not be obtained. On this plan is based the service in the library of the British museum at London and in the Bibliothèque nationale at Paris. In every story is an attendant who during the hours of service stays there continually and tends to the service of the lift without taking a step. Two kinds of hand lifts are illustrated in figs. 120-21; the one at the library of the British museum at London and the other at the University library at Göttingen. The first is made of a small case which moves up and down on a 7 cm wide leather strap, in the side a guiding rod is fastened. The framework of the case is of iron rods 15 mm thick with wire netting stretched between. The bottom as well as the iron parts are covered with leather. In the library of the British museum many kinds of lifts are used which can be moved swiftly with a small load. So that the attendants may have an intelligent understanding with one another and can swiftly send the orders on cards, in the shaft of every lift the mechanism visible in fig. 120 is used, with which with the aid of a catch spring on a line the orders on the cards are carried out. The lift at Göttingen (fig. 121) is fashioned after the one used at the Bibliothèque nationale at Paris. This is double and the cord on which the box hangs passes over and underneath on



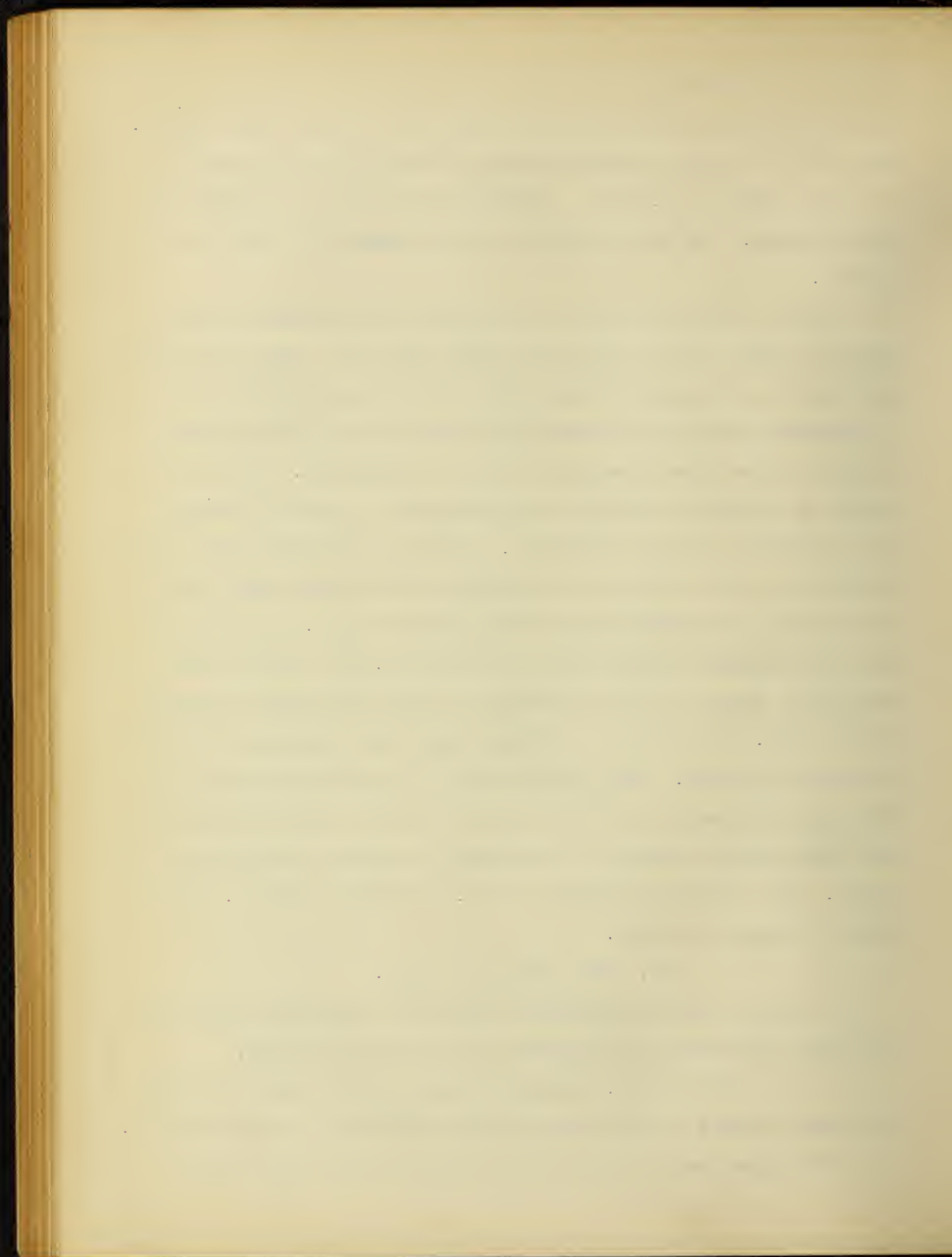
pulleys. The framework of the box is of round iron bars 13 mm thick with metal bottom, all construction parts are covered with leather. The front of the box is open and only at the bottom is closed by a leather strip 13 cm. wide. Inside on the side is a pocket for holding cards. The box is guided by four thumbs of T iron (see the figure).

Smaller libraries which do not in any way approach so great a number of under assistants, as the great institutes just considered, are limited in the use of hand lifts. On that account it is best to construct passenger elevators which can be run by the attendant on service, who takes along the book to be exchanged. With the existence of hydraulic pressure the arrangement of such an elevator can be effected without difficulty. Similar arrangements are to be found in the Royal library at Stuttgart, in the Grand ducal library at Karlsruhe, in the University library at Göttingen. The lift in the last mentioned library can be seen in fig. 122. The elevator consists of upper and lower framework of angle iron held together by iron bars. It is hung on a wrought iron cross bar and is balanced by opposite weights. The guiding load is passed over ribbed pulleys which are moved by a winch, by the slightly oscillating suspension apparatus the tension of the cords is adjusted and swaying prevented. The rolling car weighs 116 kg. the weights 133 kg. and the load is reckoned at 99 kg.

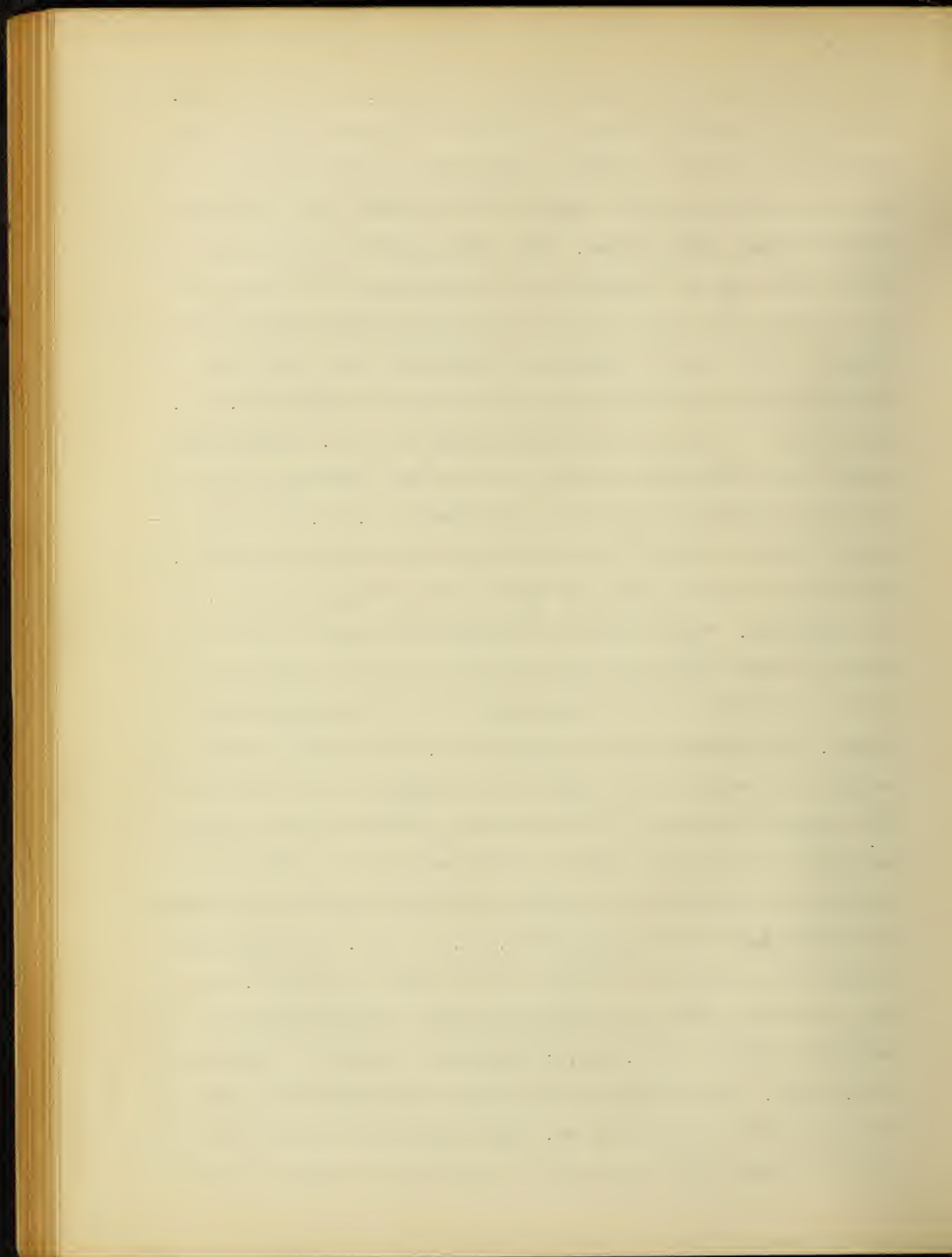
71. The completed stacks.

To explain the foregoing exposition some completed stacks will be briefly described and illustrated by adjoining designs.

(a) In fig. 123 may be seen a cross section of the four upper stories in the stacks of the University library at Halle. The entire stack rests on the ceiling construction which extends



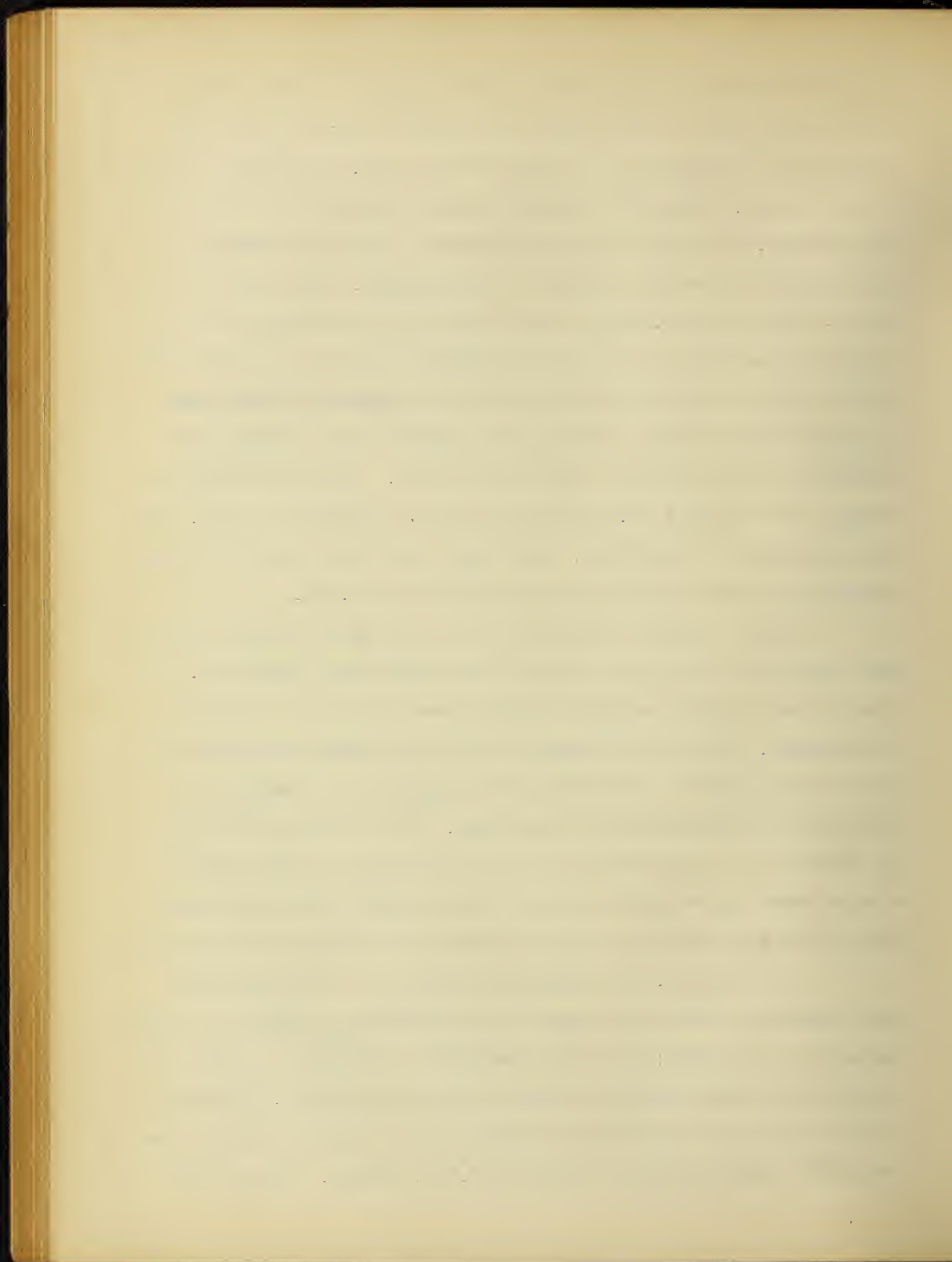
over the second story of the library building. Each stack (fig. 124) rests on two supports which run through the entire depth of the building at distances of 70 cm, these rest in their turn on beams which are laid along the length of the building, the latter are supported on cast iron columns. The iron supports on which the stacks immediately rest are concealed in the masonry of the vault and in the filling above them so that they are protected from any fire. The supports which bear the ceiling of the stack room stand above the just mentioned cast iron pillars and are at a height of 9.2 m. constructed of hollow cast iron columns of 27 cm. diameter made of two pieces fastened together. So far the interrupted intermediate floors which are placed at a distance of 2.3 m. above one another, are not supported by the stacks, but in central aisle 4.2 m hood in all stories, beams of rolled iron at distances of 1.05 m are necessary. These beams are fastened with angle iron to the longitudinal beams which run from one pillar to another and bear small T iron which makes a firm foundation for the interrupted cast iron plates. The stacks over the height of 9.2 m are made of wood and besides the weight of the books have to support also the weight of the intermediate floors. The necessary firmness against bending is maintained chiefly in a strong connection with the pillars and with supports at the side of the central aisle so that only the ~~strain~~ from the pressure at a height of 2.3 m. is left. In consideration of this every upright is formed of two strips of pine (11.5 cm wide and 5 cm thick) and at the height of every intermediate floor cross beams are inserted (fig. 124.); the panels consist of pine boards 2 cm. thick. The uprights in every story are fastened to one another by 2 fixed shelves 25 cm. apart which are fastened to the uprights by angle iron so as not to lessen the strength of the wood



by inserted edges and pegs. At half the height of every story a third fixed shelf is constructed in a similar way; all the other shelves are constructed of a frame of pine 3 cm. thick with panels of pine 1.5 cm. thick, are movable and run through the entire depth of the stack. They rest on brass supports which are inserted in neat borings in the pine strips of the uprights. The width of the double stack is 50 cm. and at the lower part is increased to 70 cm. In order to be able to lay the interrupted iron plates of the intermediate floor in the long aisle running from stack to stack iron strips are placed always striking the centre of the upright and fastened to these uprights with wood screws. From one strip to another iron plates 3 cm. thick are placed in grooves (see fig. 116). The arrangement of the 25 cm. wide light shafts and the 27 mm thick stepping rods have already been described in art. 68.

(b) A similar construction was carried out in the University library at Kiel which was built by Gropius and Schmeiden. Instead of wood stacks, wrought iron was used throughout even for the supports. After the example of the Bibliothèque nationale at Paris, each story is constructed of a complete iron framework in horizontal and perpendicular directions. Both constructions have the fault that it is difficult to use the lower and upper shelves of each story and that the uprights are provided with projections both at the front and at the rear which may be injurious to the books.

(c) In figs. 125 and 126 are shown the ground plan and cross section of the stack room of the University library at Amsterdam built by de Greef; this has a capacity of 100,000 v. Along the length of the stack room is a row of iron pillars (fig. 125-126); on these and on the surrounding walls of the room are laid the intermediate floors of four stories at 2.5 m. height. These floors



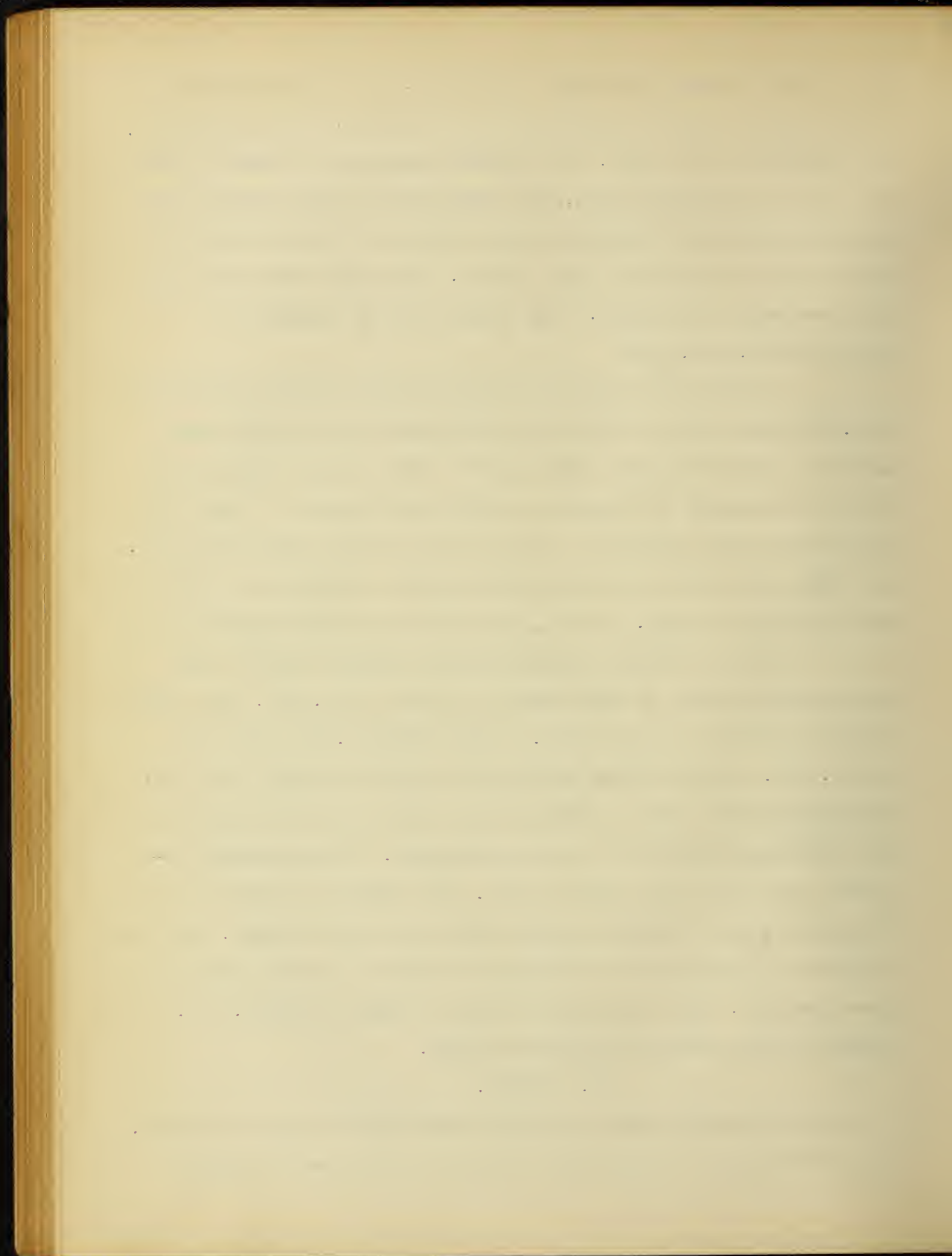
are of iron provided with light shafts(fig. 123) The supports on which they are laid are constructed of iron (fig. 121) as well as the framework of the roof. The stacks themselves are made of wood, the shelves as has been said, are constructed of wood strips which are placed at equal intervals on the uprights. Fig. 127 shows the arrangement of stacks and light shafts. The light comes from sky light and some side lights. The windows run up through two stack stories.(fig. 125)

(d) For the stacks of the University library at Göttingen (fig. 129) which are provided with galleries, the iron main supports are double with the idea that the depth of the double cases would correspond to the distance between the supports. These supports serve also to bear the framework of the roof over the stacks. The stacks themselves are constructed of wood, examples of this have been explained by figs. 97, 121, 122 and by the adjoining text.

(e) As a further example of iron stacks those of the Royal public library at Stuttgart are given in fig. 131. The length of these is from 3, 5 up to 6 m., their height 2.27 m and their depth .75 m. In the ground plan can be seen the wrought iron supports whose cross shape is shown in the cross section, these form the entire construction of the main supports. These make the uprights effective in the simplest way. The shelves are made of wood, stepping rods are fastened in iron brackets to the upright. Brackets to which one can hold in climbing on the rod are firmly fastened to those uprights. The intermediate floors consist of oak 3.3 cm. thick which are laid on rolled iron beams.

72. Ladders.

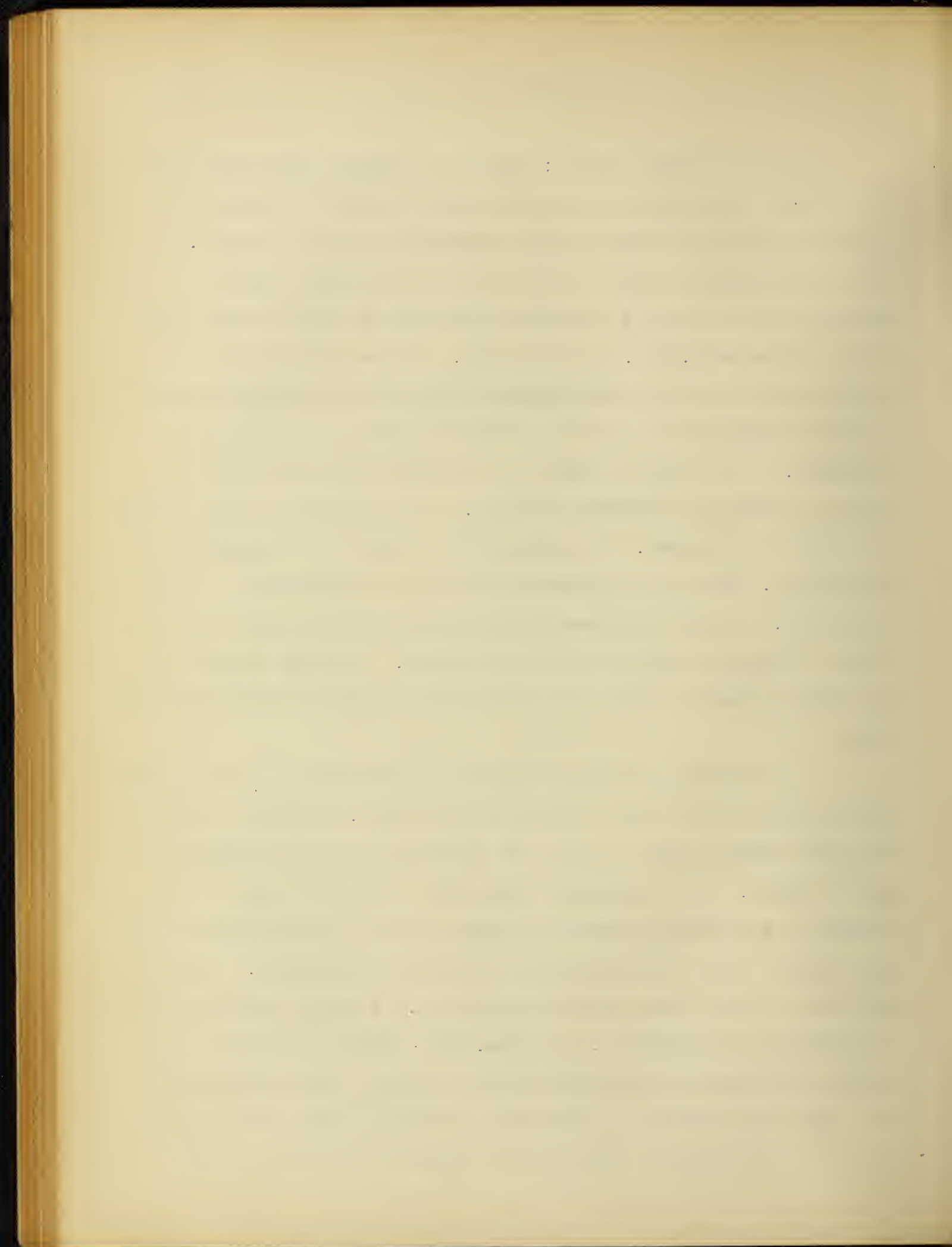
For high stacks which are still constructed in many libraries, the use of ladders is necessary, so that one can use the highest



part of the stack. These ladders are constructed in many suitable ways.

(a) Portable ladders; these are ladders which generally rest against the stacks, so that they can be used with safety and without injuring the books, great precautions are to be taken. A suitable and usable ladder is that used in the Royal library at Brussels (fig. 132) This is made of pine and in spite of the length of the ladder of 3.65 m. is very light. At the height which the normal position of the ladder demands three shelves project against which the supports (s) are laid, so that injury to the books is prevented. At (x) guiding rods are fastened so as to be able to place the ladder at different heights. At a distance of four rounds the ladder is anchored. The lower eight rounds are strengthened by iron plates. The little platform at the top is convenient to lay books upon. In many instances ladders are desirable which can be placed in the open space between the stacks. A useful example of this kind is the one used in the University library at Strasburg (fig. 133).

(b) Rolling ladders which are easily moved by the assistance of rollers or little wheels at the bottom. Lightness in movement and safety in use are the main requisites which one demands in such a ladder. Good examples of this kind are to be found in the library of the British museum at London, in the Bibliothèque nationale at Paris and in the University library at Strassburg. The last mentioned ladders were made as high as 3 m., a height which rendered the construction difficult. In figs. 134 -136 two examples of the ladders at Strassburg are shown which exhibit a good arrangement and light construction and which also reach the limit of height admissible for practical use. In the library of the Genevieve at

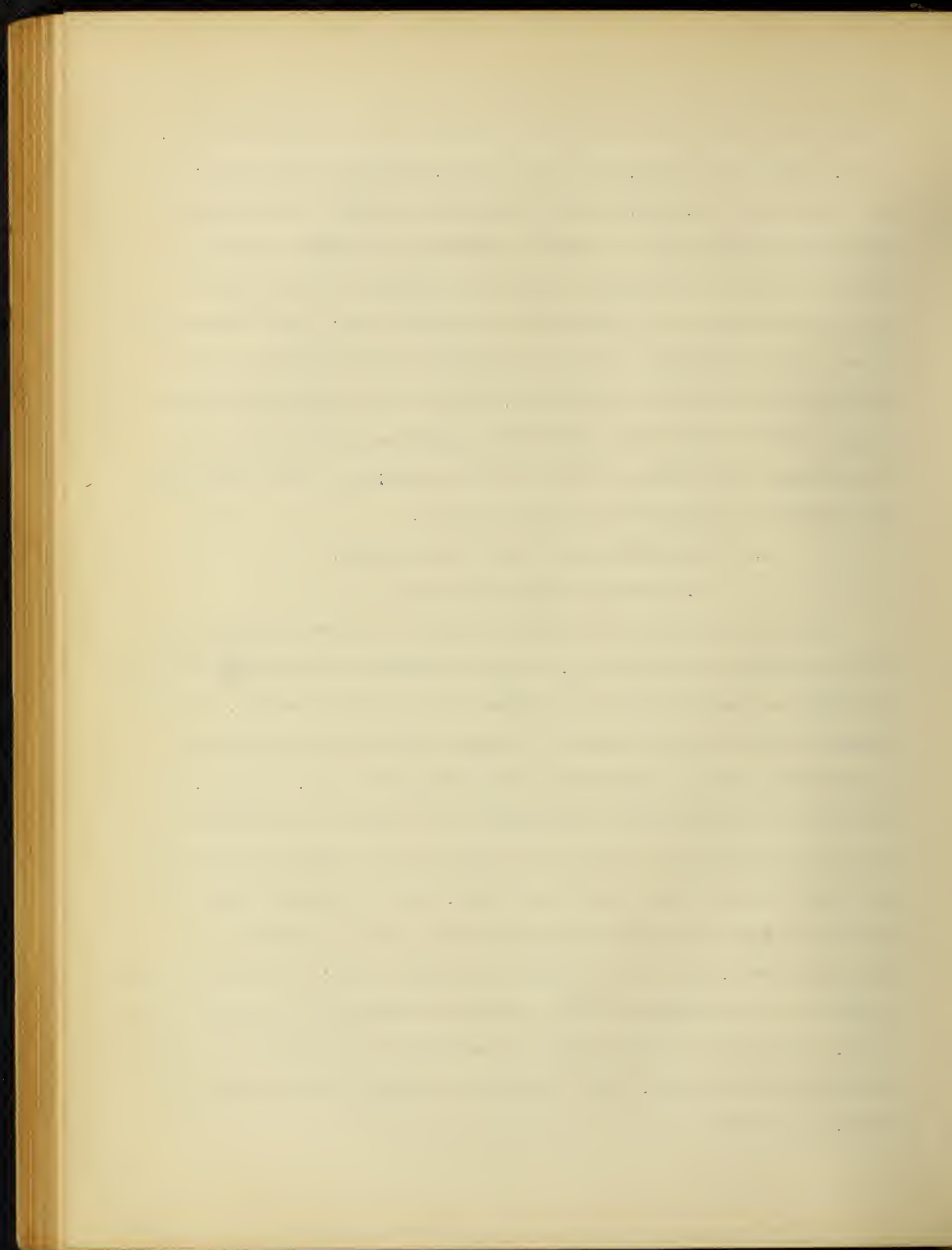


Paris rolling ladders of a different style from others are used which are rolled along on rails parallel to the rooms of stacks. (fig. 137) These are 1.56 m. long, 54 m. wide and 2.2 m high; the four rollers of 6.5 cm. diameter are made of wood. The ladder is fastened to the stack to which it belongs by a guide, so that a change of ladder to another place is prevented. As a result of this great height it is wearisome to handle them; such ladders are also a poor arrangement since they render accessibility to the lower part of the stack difficult. That it is always an inconvenient and very particular task even dangerous to move the ladder has already been pointed out in another place, also that the books are injured by moving the portable ladder.

c. Other contrivances and arrangements.

73. Trucks and rolling tables.

For moving great quantities of books on a level, trucks and rolling tables are necessary. It is recommended that these be made as light as possible and constructed so as to turn easily. In the library of the British museum at London and in the Bibliothèque nationale at Paris many kinds of designs are in use. In fig. 198 is shown the truck used at the University library at Göttingen and this is considered very good. The body of the truck is of wood and the sides are of iron rods 16 mm thick. All is covered with leather. The two sides can be lowered and are held fast to the load by leather straps. The three wheels are rubber tired; the guiding wheel turns on a round gudgeon which permits the wagon to be turned on the spot. The special trucks used in the University library at Leipzig are to be seen in fig. 109. Examples of trucks are also shown in figs. 21 and 22.

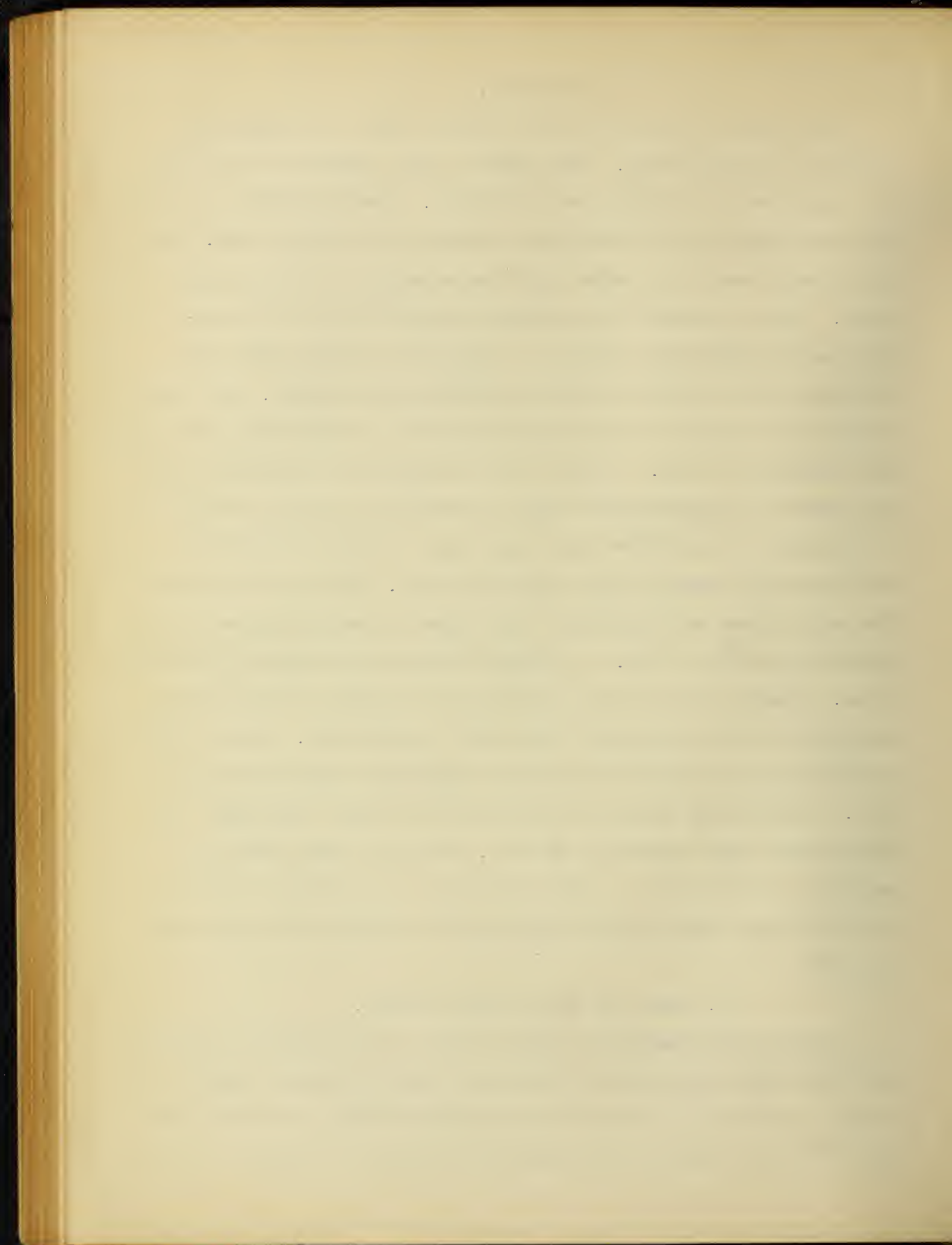


74 Cleaning.

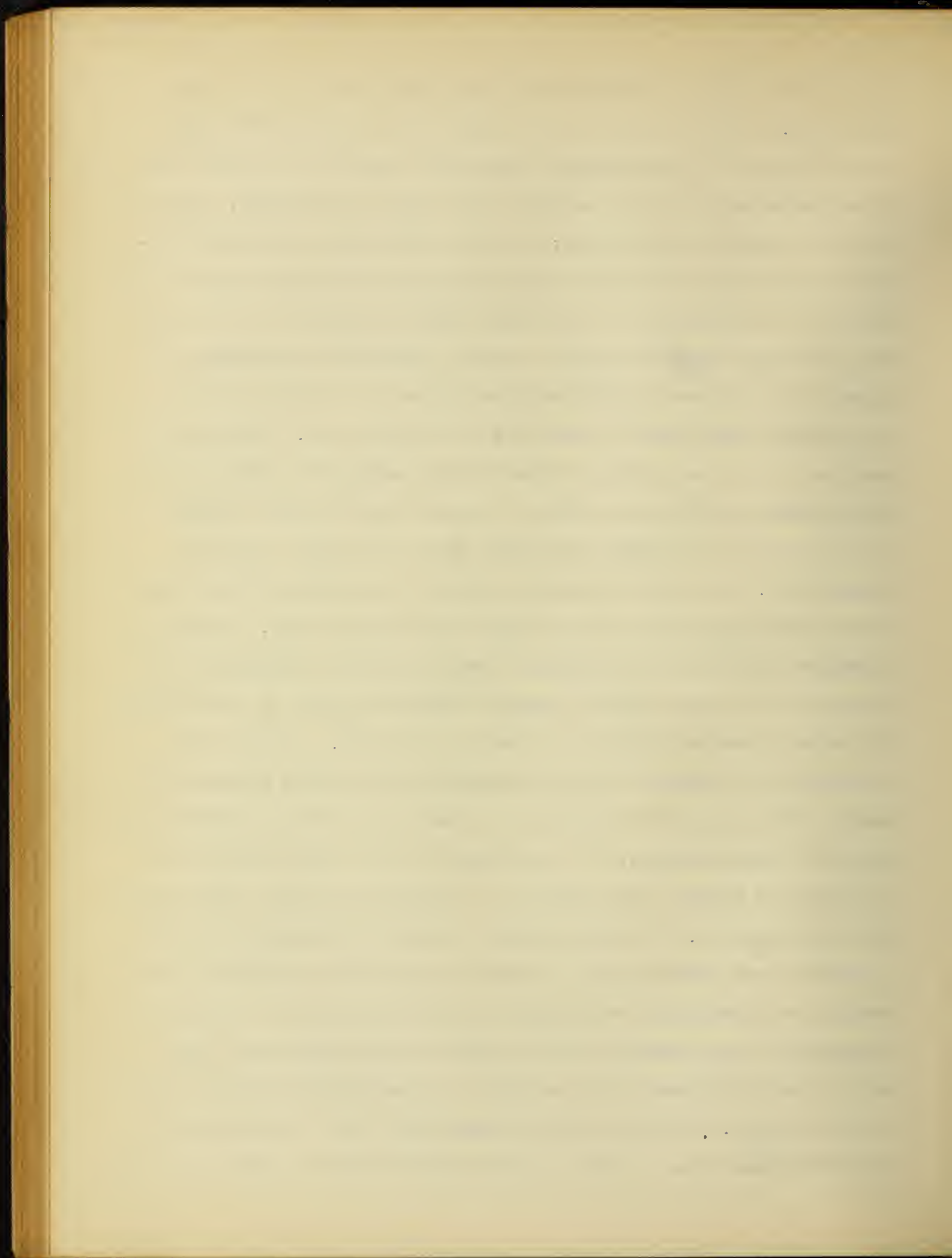
The removal of dust from the library rooms is an important problem to be considered. From time to time, annually if possible, the books are to be taken from the stacks, opened forcibly and wiped; the stacks must also be completely cleaned with a damp cloth. These requirements are to be taken into consideration in the building plans. In the library of the British museum and after this example in the University library at Göttingen in each story open balconies are provided on which the books can be shaken. The cleaning of the books can in this way be carried on comfortably and without much coming and going. For the same reason it is essential to have the stacks as accessible and easy of revision as possible which can be obtained in the simplest way in a stack system by having the least possible height between the two floors. Again the construction of a closed ceiling between the lower and upper stories as has already been said in art. 61 lightens the task of cleaning the stack rooms. Finally the windows, such as are provided, should be constructed so as to allow but little dust to penetrate. In the stack rooms care should always be taken for necessary exits in case of fire. This is best done in fire proof stair cases surrounded by thick walls, which reach all stories. Near the stack rooms, if possible in every story, a store room is to be provided in which label holders, book supports and tools for cleaning the books can be stored.

2. Rooms for special collections.

For the preservation of larger sheets, as engravings, maps etc. the proposition generally set forth for books of larger size is, of course, restricted if there is the limitation that the greater and more essential part of the collection, arranged by contents as well



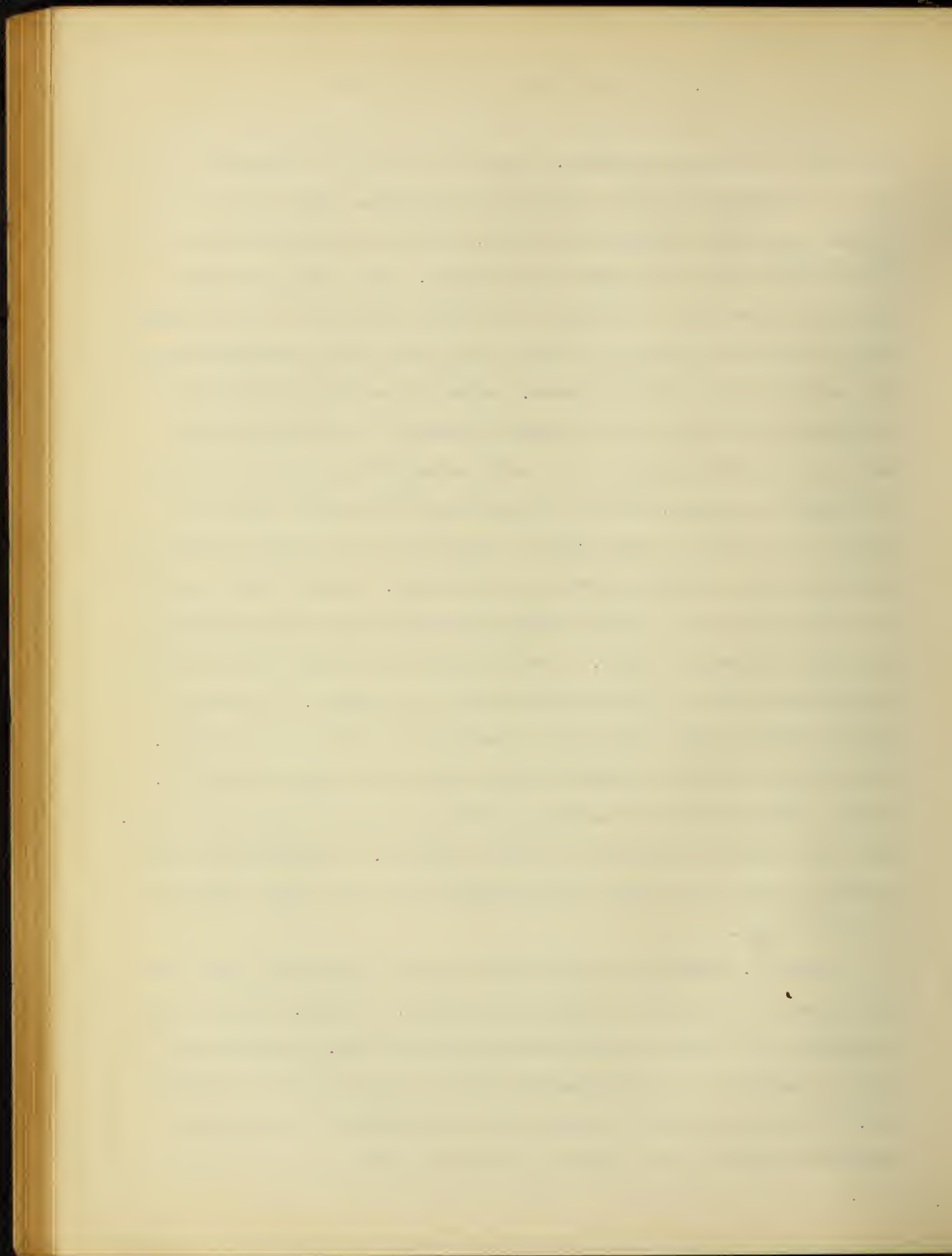
as by form, is to be incorporated in the collection in the main book room. Above all it is to be taken into consideration that those in question, particularly the very valuable collections are to be protected as far as possible from dust and sunshine, and are to be kept under lock and key; for this reason for further consultation and inspection rather large tables are to be provided in the immediate neighborhood of the closed cases in which they are kept. From the last standpoint there arises a different separation into rooms and a different axial division of the part of the building in question which differs from that of a stack room. In large libraries, as in the library of the British museum at London and the Bibliothèque nationale at Paris, a special part of the building is fitted up for maps and engravings which are under a special supervision. In smaller libraries usually on account of the confined surroundings they are arranged in the same rooms. In many libraries for fine editions and for rare books of particular historical and artistic value a special exhibition hall is constructed for which a favorable place is given in the plan. In the new building of the Ducal library at Wolfenbüttel for the storage of costly works, an exhibition hall is constructed which is divided into upper and lower stories. It is situated in the main axis of the building and brought into immediate connection with the stack rooms by large openings. The Royal public library at Stuttgart contains a magnificent central hall in which are kept fine editions, manuscripts and incunabula etc. partly on exhibition tables, partly in cases which are accessible by galleries in three stories. This hall is characterized on the outside by a magnificent attic crowned central facade. In still other libraries, for other valuable collections(^{Gems}~~glass~~ etc.) a vault is constructed which is made fire proof.



77. Cases for maps and engravings.

The cases in which maps and engravings are stored are always provided with sliding drawers. First of all to be considered is the good construction of doors and tops of drawers. Felt is to be rejected on account of danger of moths. Rubber is often used, still it ^{needs renewed} ~~be recovered~~ often for rubber soon cracks. The sliding drawers are constructed with or without horizontal division. If the drawer has to support an unusually large burden the bottom is strengthened in a suitable way with iron bars. So as to be able to comfortably store away and look over its contents easily, it is recommended that the front of the drawer be made moveable by the use of hinges and triggering springs, either for the top alone or for this and a part of the bottom. Care should be taken that the plates placed in the back of the sliding drawers are not bent. It has been accepted for a long time that sliding drawers should be made of wood which generally has proven right. However iron may be used and is a very suitable material for the rollers under the drawers. To make the bottom movable steel bands are fastened to the top of the drawer. The sliding drawers are covered inside with oil cloth or leather. In some cases instead of sliding drawers, sliding shelves are built. These are closed in front by sliding curtains. Sometimes the cases serving to hold the maps and engravings have show cases fastened on top of them.

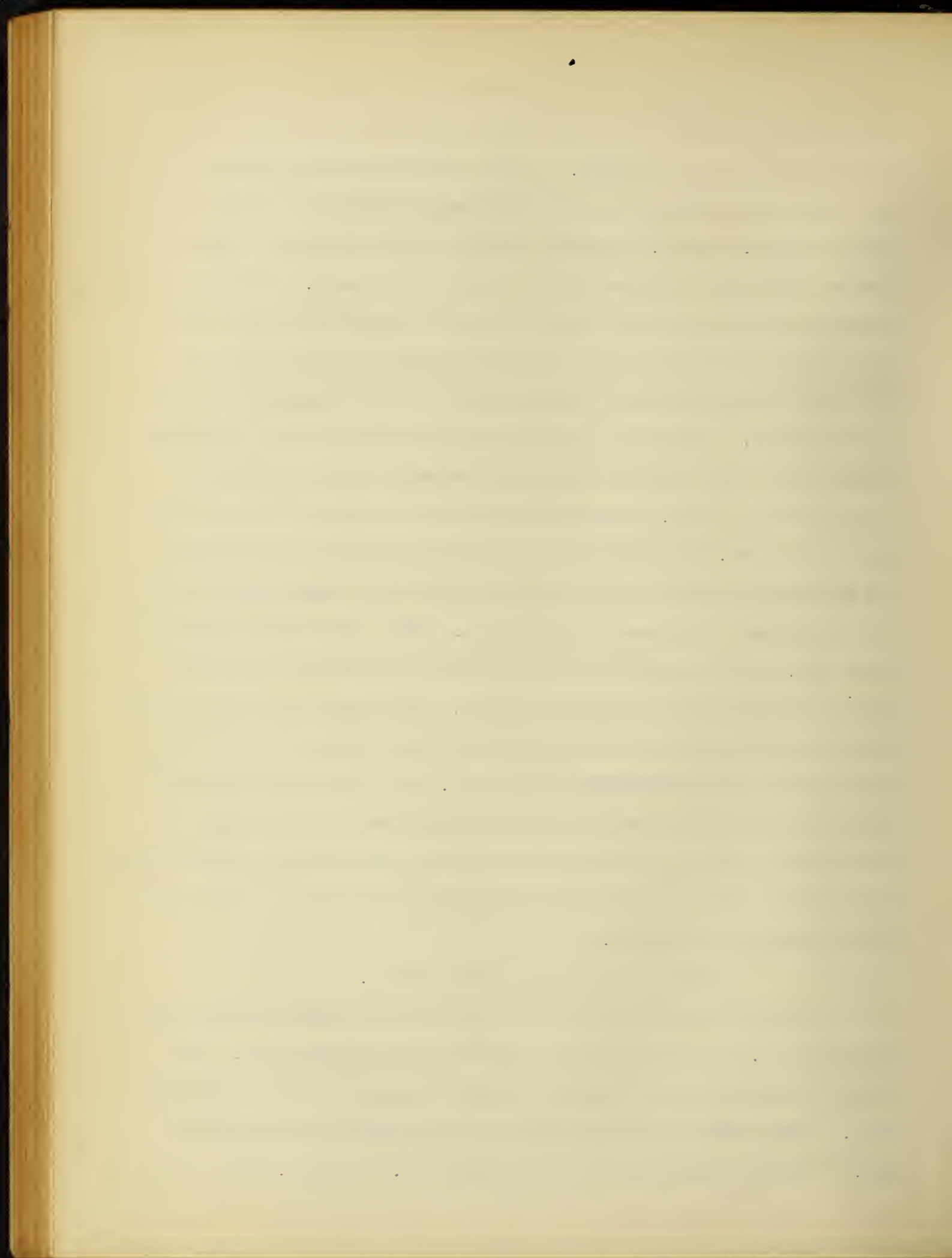
In. figs. 139-147 are shown some map and engraving cases from the library of the British museum at London. In fig. 142 the construction with rubber rollers can be seen and fig. 143 shows how iron is inserted to strengthen the bottom of the drawer. In figure 145. a swinging bottom is shown and at the back of the sliding drawer is placed a little movable board on hinges so as to prevent



the plates from bending. In fig. 146 may be seen a sliding drawer constructed of iron, steel bands are placed at every third or fourth roller of the drawer. A good form of sliding drawers to hold engravings which is used in the Royal library at Brussels is given in figs. 148-49. Springs are fastened at a,a when these are pressed the lid b,b opened and the front falls down. The little blocks of wood at the back make it easy to insert the hand from above and to take out single sheets especially large sized ones. In figure 151 may be seen the cases used at the University library at Strassburg. The single sliding shelves consists of a framework zincd glued pegs and strongly glued pasteboard which moves in grooves of hard wood. After the doors are opened and turned at an angle of 90 deg. they are held firm by a hinged iron rod so that the moving shelf when it is drawn out rests on ledges corresponding to the grooves which rest on the doors. When the shelf is entirely drawn out, it is possible to look over the contents on the spot without moving them to a special table. The construction of rolling tables for maps in the library of the British museum at London is based on the same fundamental principle. The points of the cloth covered rollers are inserted in borings placed close together in the upright sides of the table and on the rollers maps and over-large plates are placed. One of the rollers must be loose so as to take out and put in the plates.

78 Exhibition cases and pillars.

To exhibit manuscripts, rare books, single beautiful sheets, etchings etc., either cases or revolving pillars are used. The former are constructed in many different forms and many different ways. Those described in art. 22 and the cases illustrated by fig. 20 can also be used in this connection. In figs. 152 to 155



many other examples are given. The show cases shown in figs. 152-154 need no further explanation. As to the case in fig. 155 it is to be added that the base is movable and can be raised or lowered by means of four wood screws. As to the revolving pillar (fig. 156-157) on a central upright column are fastened radiating plates on rods which extend from the column by hinges. The articles to be exhibited are raised on the plates or laid in glass frames.

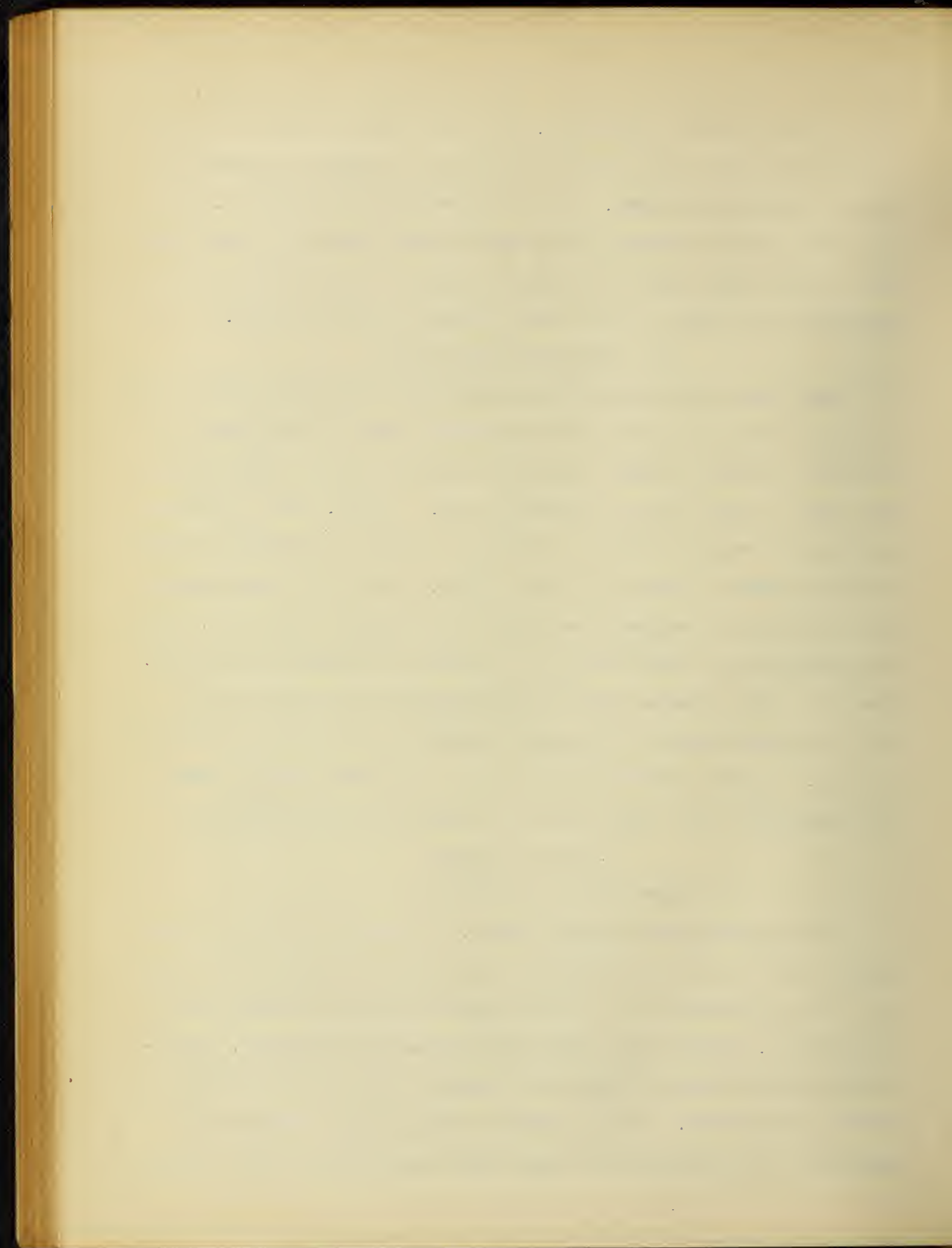
79. Preservation of maps.

Large maps are often cut in large equal rectangles, then pasted on cloth, folded to-gether and placed like books in book cases. It is better however to past the entire map on cloth and hang them as wall maps or keep them on revolving rods. In fig. 158 is shown one kind of revolving rods. A separate rod from the library of the British museum at London is shown in fig. 159. It is often desirable to consult a separate map among those hanging to-gether. Then an arrangement by this maps can be lowered or raised is necessary. There are many patented American constructions for this purpose, yet the Schlor patents originally intended for the drop curtain can be used. Musical works if they are not too large, are kept just like books and the largest sizes are protected like engravings.

3. Reading Rooms.

80 Rooms for use of public.

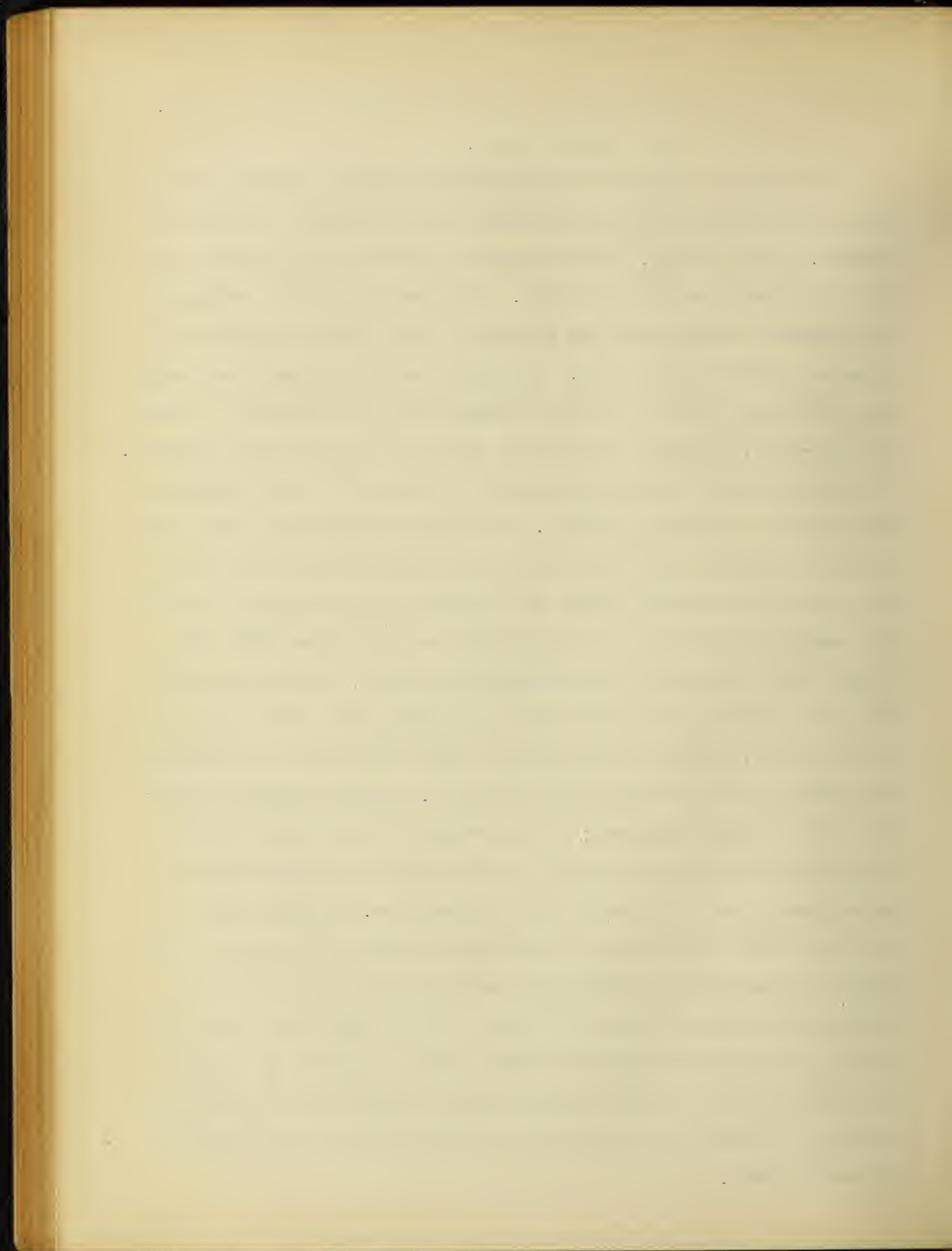
It has already been stated in Art. 39 that for the use of the public first of all a delivery and reading room should be provided or, if it is decided not to loan books outside the library, only the latter. Besides cloak and toilet rooms are necessary. According to the contents and kind of a library, one or more reading rooms are to be provided. In the general reading rooms, newspapers, pamphlets and manuscripts are only rarely used and for this reason,



it is best to set apart special rooms, particularly for the last.

81 Reading rooms.

The reading rooms in the libraries of France, England and North America are generally somewhat larger than in Germany and Austria, Hungary. In the latter, they are not so restricted and punctillious in loaning books as in the former. In Germany and Austro-Hungary the domestic studies have the ascendancy over work in the reading rooms and, in the University Libraries, as has already been said, they allow only fellows in the colleges and other scholars to enter the book-room, to work in it and to choose the books to be borrowed. In reading rooms, care must be taken for adequate light, efficient ventilation and proper heating. That these rooms should be placed as far as possible from the noise of the streets has already been said, but the confusion within the library building should also be far removed from them. It is important to lay a floor ^{of} ~~and~~ such a kind that walking will not disturb the reader. To secure safety from fire, cement and stone floors are recommended still wood floors are also laid. Under all conditions, these floors are to be covered with water-proof and ~~dis~~^ust-proof material. Linoleum adapts itself very well to these purposes; in the reading rooms of the library of the British museum at London and the Bibliotheque nationale at Paris kamptulicon is selected for this purpose. Reading rooms in the majority of libraries are arranged according to a plan of rectangular shaped rooms in which the reading tables for the use of patrons run along or across the room. On the other hand, the reading room of the British museum at London, which is placed in the new extension, as well as the reading rooms of other central places is formed in a circle or polygon and corresponding to this a rotunda is constructed .



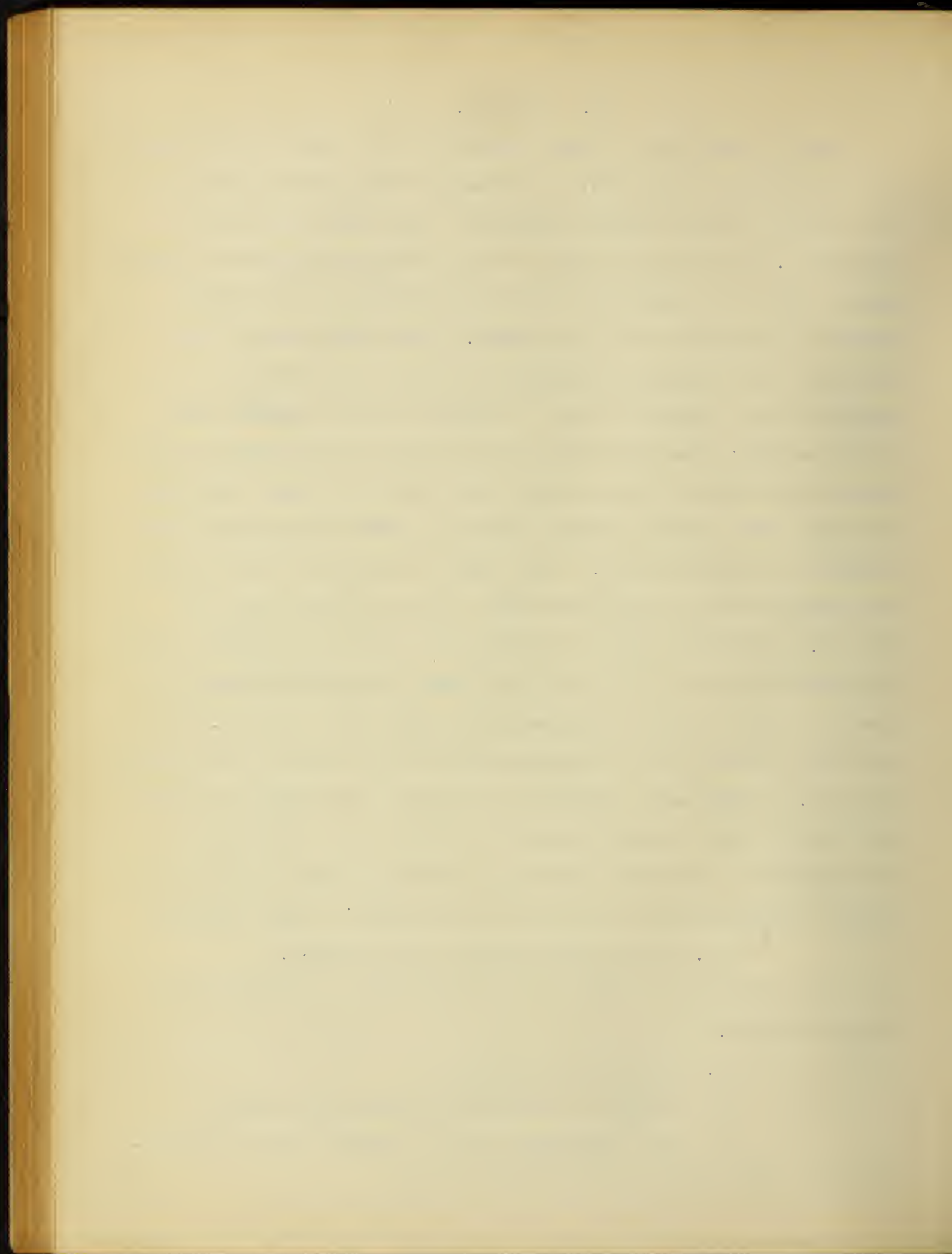
82. Lighting.

Reading rooms are, by day, lighted by side lights or sky lights or a combination of the two. If a reading room is only lighted by side windows, in most cases necessarily they should be in both side-walls. As soon as the depth of the reading room becomes considerable, light from only one side fails to extend to the reading tables at a distance from the windows. The reading room of the Court and state libraries at Munich is a clear proof of this. To obtain the best possible light, one should let the windows reach to the ceiling; since the walls are used for dictionaries and other books, high windows often are used. The demand to supply the reading rooms with windows in both side walls, often causes great difficulty in the ground plan. From this it results that the farther the reading rooms are from the table, the more poorly they are lighted. It follows that the reading room should be placed in the top story and should be lighted from above, and in most large libraries, light for the reading actually comes from the roof. If opportunity offers to build windows these will be used too for lighting purposes. In many small libraries in England, the light of the reading room has been arranged in such a way that the windows, so fashionable in dwelling houses are transferred here, in every bow window a reading table is placed which evidently is well lighted.

83. Arrangement of the reading tables.

The following are problems for the placing and other arrangements of tables.

- a. The kind of lighting
- b. Endeavor to economically use the tables.
- c. The condition that the readers will not be disturbed by people moving about between tables.

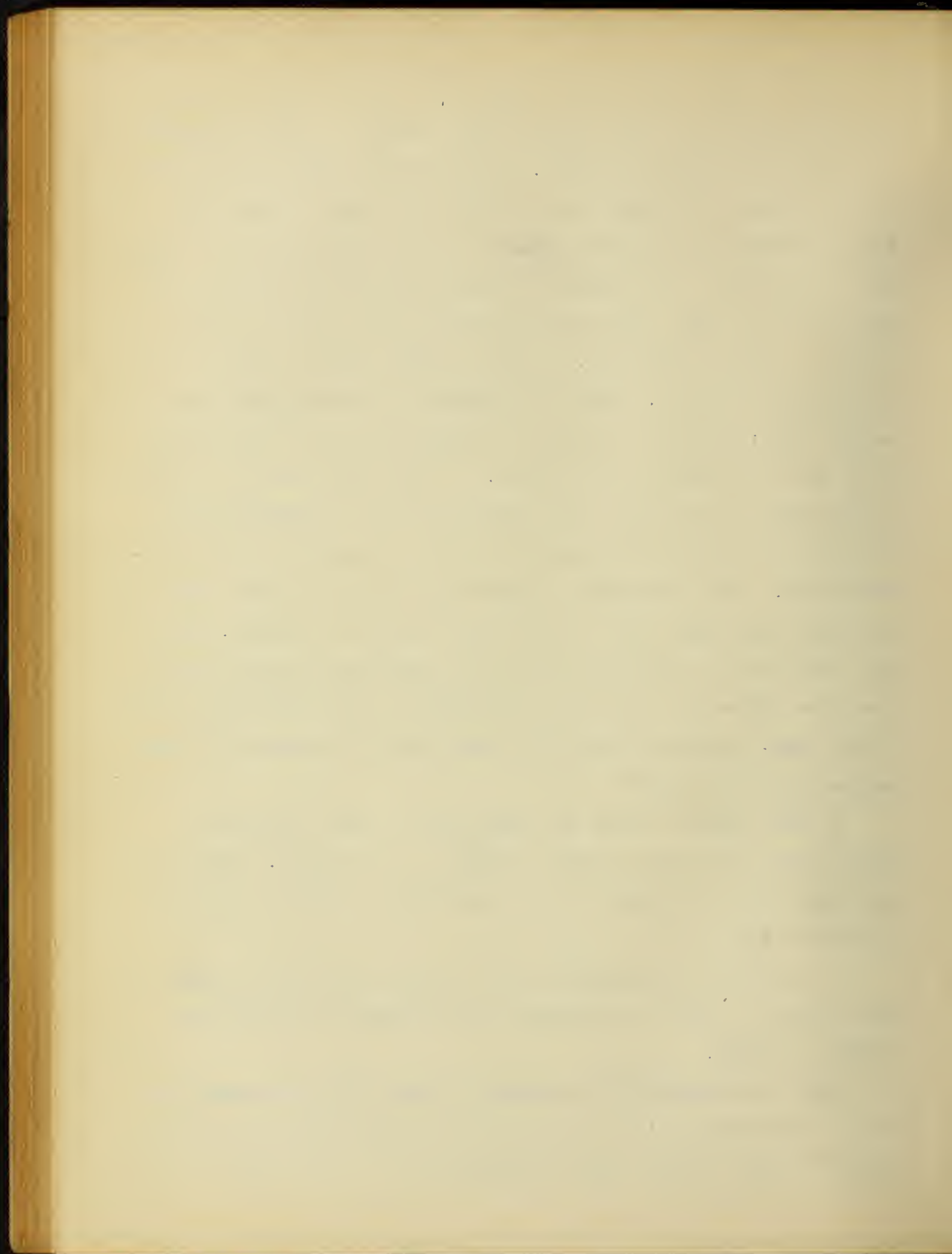


If the light for the room comes only from the side the tables are to be placed at right angles to the windows so that the reader will have the light at his side. If the row of tables is parallel to the windows, the reader who has his back turned to them will throw a shadow on the working place, also to look toward the light will be harmful. It is commonly accepted and is the best arrangement, when the light falls from the left, this is obtained by using one side of the table. In fact, in many cases, reading tables of that kind are used. However in interest of economy, one must disregard these; generally tables are arranged which are broad enough to be used by readers on both sides. If the reading room is lighted by sky-light the placing of the tables from the stand-point that every work place shall be lighted as well as possible is of no consideration. The stand-point of practical economy of space under the considerations under (c) is before all, the basis assigned. Starting from this with the supposition of a rectangular shaped reading room, the tables are to be placed parallel to the longitudinal walls of the room: no other arrangement allows such a favorable and economical use of the space.

If side windows beside the sky light are used the rows of tables are to be placed at right angles to the windows. Finally one must plan that the readers will be disturbed as little as possible by moving about.

In circular or polygonous shaped reading rooms the reading tables radiate as they are arranged in the library of the British museum at London.

From the standpoint of economy of space this arrangement can never be advantageous; if the tables are placed radiating from the center as near to each other as possible or if their width is di-

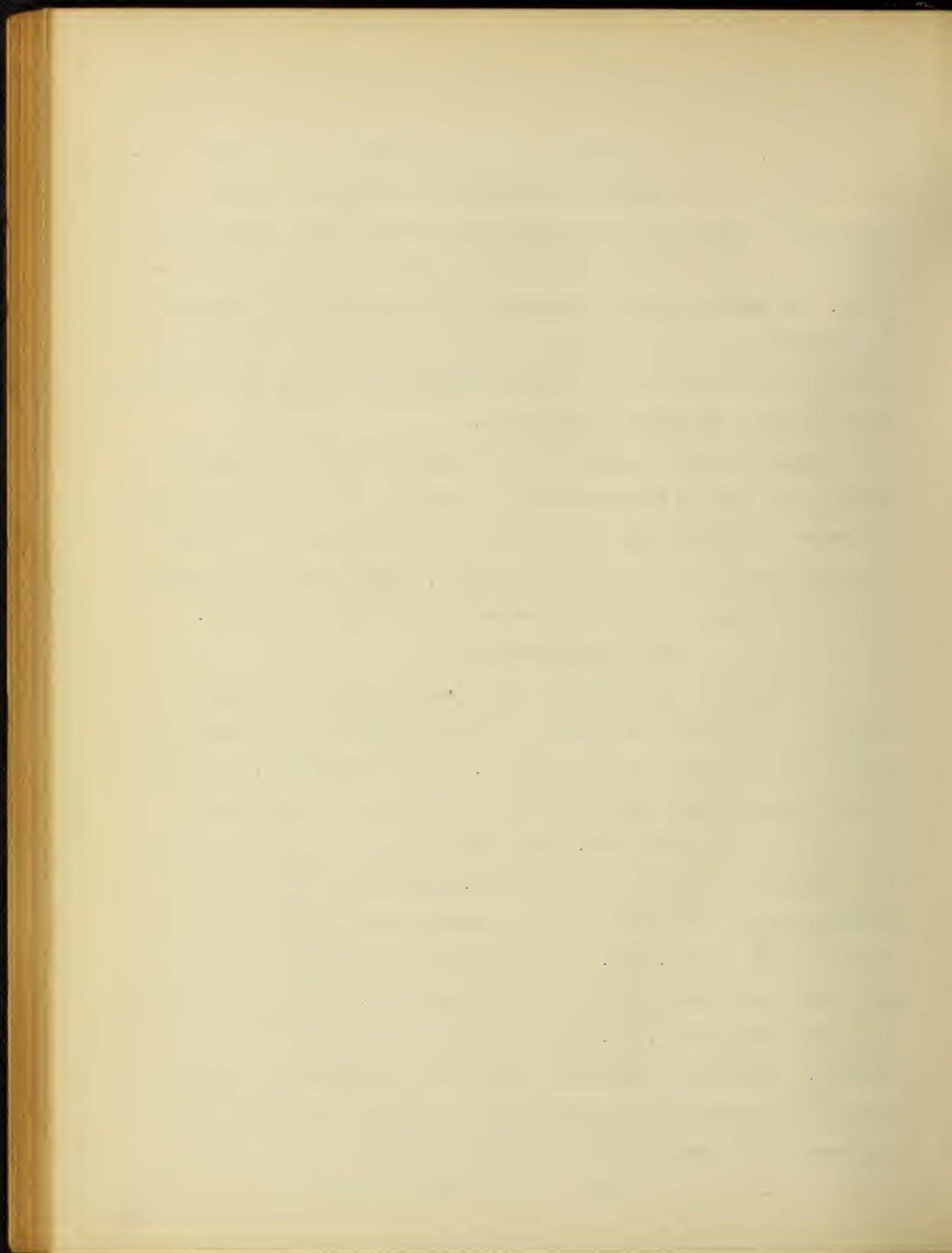


minished somewhat it cannot be entirely overlooked that people moving about and those reading at the tables will interfere with one another. If the possibility of surveillance of the whole reading room by the attendants is considered an essential matter, then the radiating position of the reading tables so that each attendant may have his place in the center of the room is the most advantageous. An economic use of the space is provided by the arrangement of concentrically shaped reading tables, although the curved shape of the latter brings with it many disadvantages. This row of tables must be broken by radiating passages.

Burghoffer has proposed for the reading room in the British museum this kind of table in place of the straight radiating tables. To secure supervision by an attendant in the centre in the same proportion as with the other kind of tables, these should be occupied only on the outer side so that readers sit behind each other.

84. Reading tables.

The form and construction of a reading table differs only slightly on the whole from that of other strongly built tables, the example given lately is an exception. As to dimensions, the height of the reading table does not differ from that of other work tables, it is usually from 76-78 cm. The width of the table depends upon the necessary depth of the work place. Experiences teaches that the minimum breadth is 60 cm. so that a table used on both sides should never be less than 1.2 m. wide. However these dimensions are too small for comfortable work and less than 70 cm. width for each work place and less than 1.4 m. width for the table should not be considered. But these dimensions demand that the opposite work places should not be separated by partitions or other limitations from one another, when these are used a respectable width of the table is presupposed. As soon as such a limitation is considered the width



of the table must be increased and in this respect they have even reached 1.8 m. The length of the work place is generally reckoned as 1 m. and often this dimension is exceeded. In some few instances this length has been exceeded up to 1.25 m and over. Smaller dimensions which are used down to 65 cm. are insufficient. In the following tables some dimensions of reading tables are given.

Library.	Length of seat	Work - place		Height of chair
		Depth	Height	
Library of British museum at London	1.27	.62	.76	.45
Bibliothèque nationale at Paris	1.	.56	.78	.46
Bibliothèque Ste-Genevieve at Paris	.65	.75	.75	.47
Grand ducal library at Karlsruhe	1.05	.66	.78	.45
University library at Leyden	1.	.72	.78	.46
Bibliothèque royale at Brussels	1.	.90	.76	.46
University library at Göttingen	1.	.62	.78	.47
University library at Halle	1.	.62		

The distance between the rows of tables depends upon the condition already given that the readers will not be disturbed by the moving about. Besides a space of such breadth must be left between the chairs placed along the table that one can move about without disturbing the person in a chair. Judging from experience a distance of not less than 3.2 m. from center to center of the narrow tables and of not less than 3.35 m. with the wider tables is to be chosen. If more generous dimensions can be selected, in the first case up to 3.35 m. and in the second up to 3.50 m. has been chosen.

To separate the opposite work places from one another a partition lengthwise of the table is desirable. In most cases a wide strip projecting about 10 to 12 cm. above the table is considered sufficient, sometimes a regular partition 50 to 60 cm. high is built; by this the view of the opposite place is shut off but it can be used to lean books against etc. The supervision of the reading room is rendered difficult by this method. In reading

The first of these was the establishment of the city of Boston in 1630. The second was the establishment of the city of New York in 1624. The third was the establishment of the city of Philadelphia in 1682. The fourth was the establishment of the city of London in 1666. The fifth was the establishment of the city of Paris in 1660. The sixth was the establishment of the city of Rome in 1644. The seventh was the establishment of the city of Constantinople in 1453. The eighth was the establishment of the city of Mexico in 1519. The ninth was the establishment of the city of Lima in 1535. The tenth was the establishment of the city of Lima in 1535.

1630	1624	1682	1666	1660	1644	1453	1519	1535	1535
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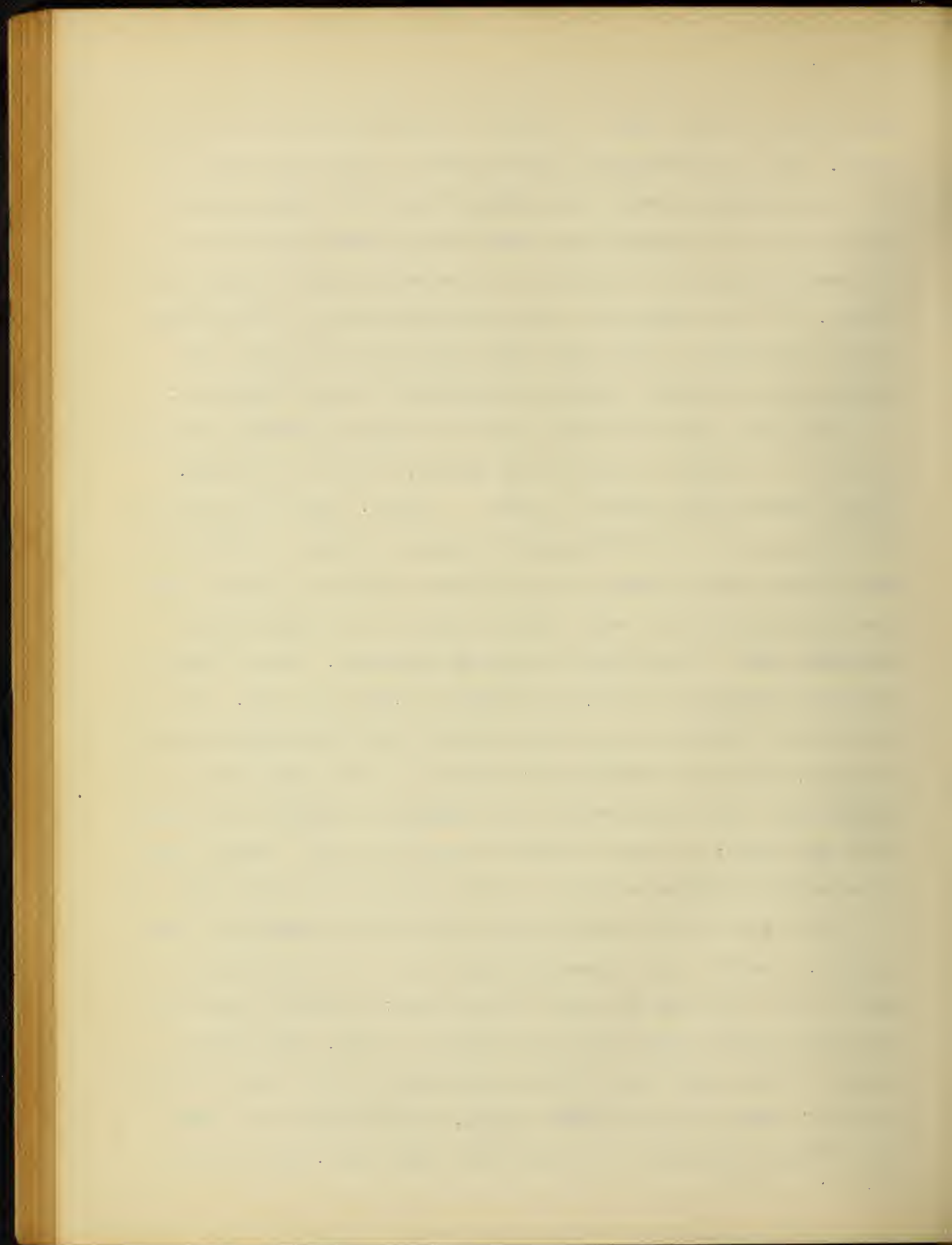
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rooms of the new University library at Leipzig these partitions are used also to attach lamps to between two reading places for evening light. These partitions are usually used to fasten ink stands to, they also project in such a way that at the bottom they can serve to hold pens, lead pencils and other writing materials. The use of loose ink stands can easily give rise to spoiling the books and tables. For this reason one should also avoid putting ink stands in the partitions in such a way that they can be taken out from above; there are better results from putting them in from below.

The upper surfaces of the tables are usually covered with leather, as in the library of the British museum, cloth or oil cloth. Almost always black material is used. Rarely they are painted in dark colors as in the Bibliothèque nationale at Paris. Tables of dark grained oak are used at the University library at Halle. For the administration of a well ordered library it is emphatically necessary that the individual places be numbered. When a book is asked for the number of the place must be given on a slip. At every place in the tables in the reading room of the Bibliothèque nationale at Paris, holes for ink-wells are provided in the lower part of the central partition. Each seat is made separate by strong partitions under the table; on these are knobs to hang hats on. The hot water pipes under the table serve as a place to put the feet and warm them.

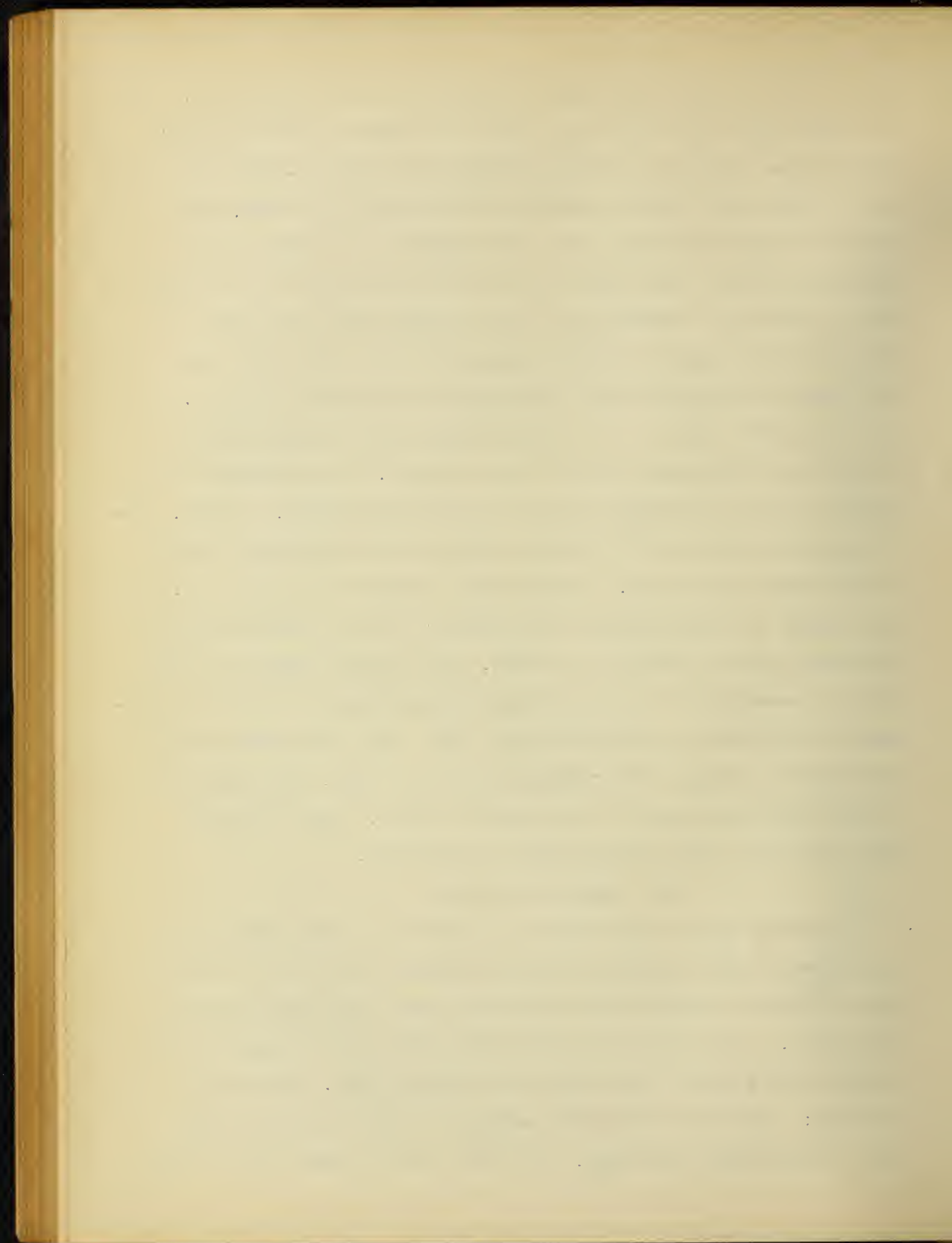
The tables in the reading room of the British museum are shown in figs. 163-66. So that opposite readers will not disturb each other, that is will not look into each others faces; an upright partition has been erected lengthwise of the table (see fig. 163). From the latter a book support drops down at each place at the right of the ink-well. When it is no longer needed, one can easily put back his part and the whole can be laid flat again (fig. 165) An iron



door T supplied with two hinges is fastened to the partition S. At the outer half (that is on that which has hinges on only one side) close to the hinges is a notches strip b (see also fig. 166) for the prop g. The latter holds a shelf b of the size of the whole iron door T to hold the books. This is fastened by two hinges to the upper edge of the outer half of the door H and bears at its lower edge an extension C which when clapped against the main shelf is held by an iron spring, but when lowered forms a level with the main shelf and extends this. Underneath is fastened a ledge e. At the left of the ink well is a perpendicular shelf which when not in use can be fastened again to the partition. The surfaces of the reading tables are formed of zinc covered with leather. In figs. 167-68 the construction of the reading table of the University library at Göttingen may be seen. The distance between the tables of 3.45 m from center to center prevents the reader's being disturbed by people moving around between the tables. The chosen length of a work place is everywhere 1 m. The central strips which are placed lengthwise of the table are visible in fig. 168. Fig. 167 shows how the ink wells are placed from underneath in this strip. The surfaces of the tables are covered with black oil cloth. The individual work places are separated by upright partitions.

85 Large work places.

In most reading rooms one sees a number of large work places usually especially constructed at individual tables for the use of those wishing to study many works at the same time, which demands more space. In the reading room of the University library at Göttingen these larger tables which are shown in figs. 169-70 are provided; the tops of them are movable so that the books needed can be comfortably consulted. In other reading rooms one is aided



by little movable book supports on which books can be placed when several works are to be consulted at the same time. Some special arrangements which are used are shown in figs. 171- 73.

86. Supervision.

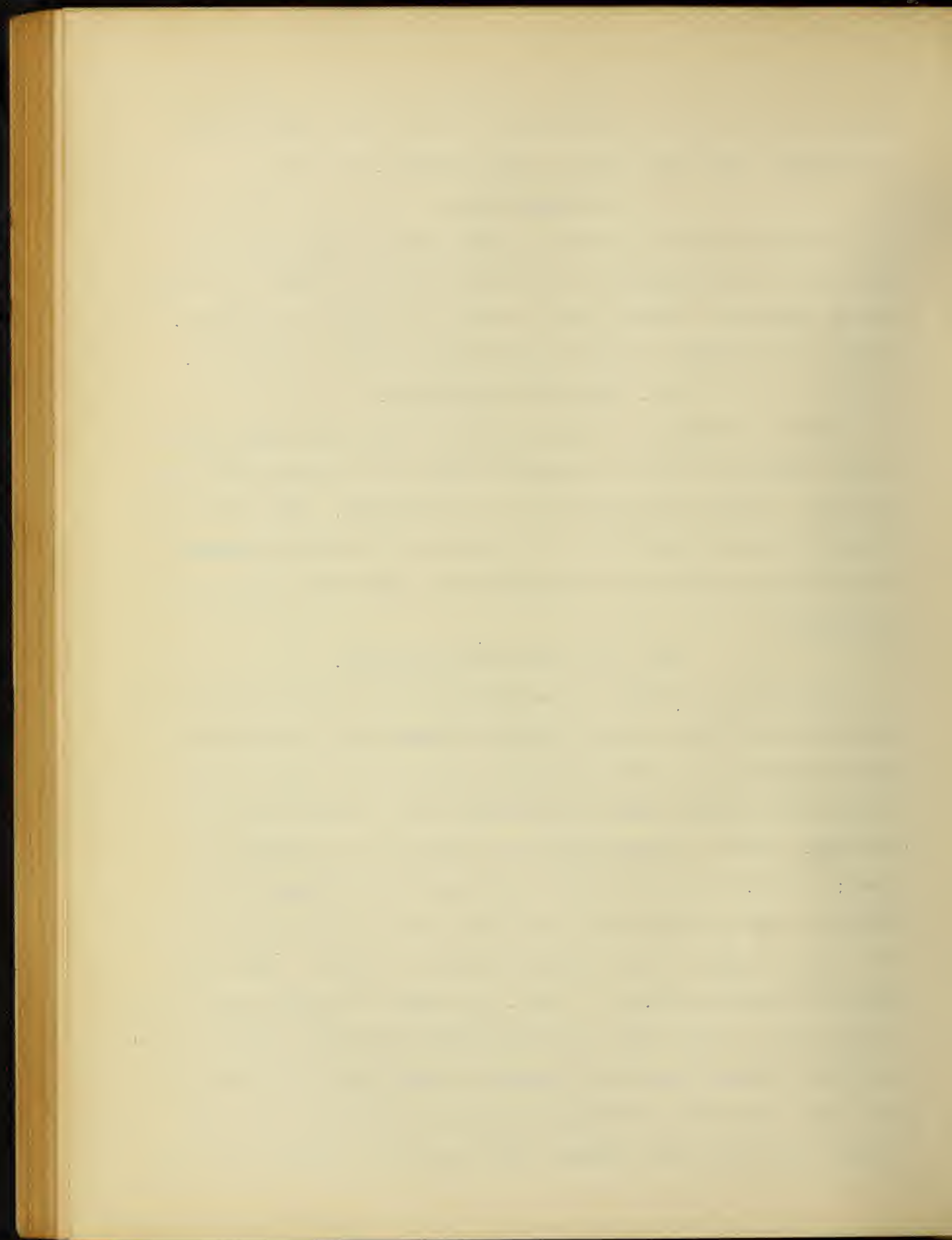
It is necessary to provide a place for the custodians from which can be comfortably seen the people who are coming and going, moving around the reading room or using the books at the tables. It is best to construct a place raised from the floor of the hall.

87. Place for attendants.

For the attendants who are to get and issue the books desired by the readers in the reading room as well as to receive the books returned, suitable work places are to be provided. Near the latter, desks for writing cards are to be placed and the cases necessary for the catalog which is to be used on the spot under certain circumstances.

88. Book cases and galleries.

In the hall libraries the walls are always used for storing the collection for which purpose, suitable stacks are to be erected. In order to be able to reach the higher parts of the stacks, either ladders or a gallery which is accessible by a stairway are to be provided. In art. 42 many examples of the old hall library are given; in fig. 176 is shown the ante room of the library of the Ecole de droit at Paris which is illustrated in fig. 68 and in fig. 176 is the library of the People's palace at London. The latter forms an octagon of 23.32 m. width. But even in reading rooms which do not serve as book rooms the dictionaries most used, encyclopedia's and other reference books are usually placed around the walls. In many small libraries in England the respective stacks which are movable like partitions, project from the row of windows into the



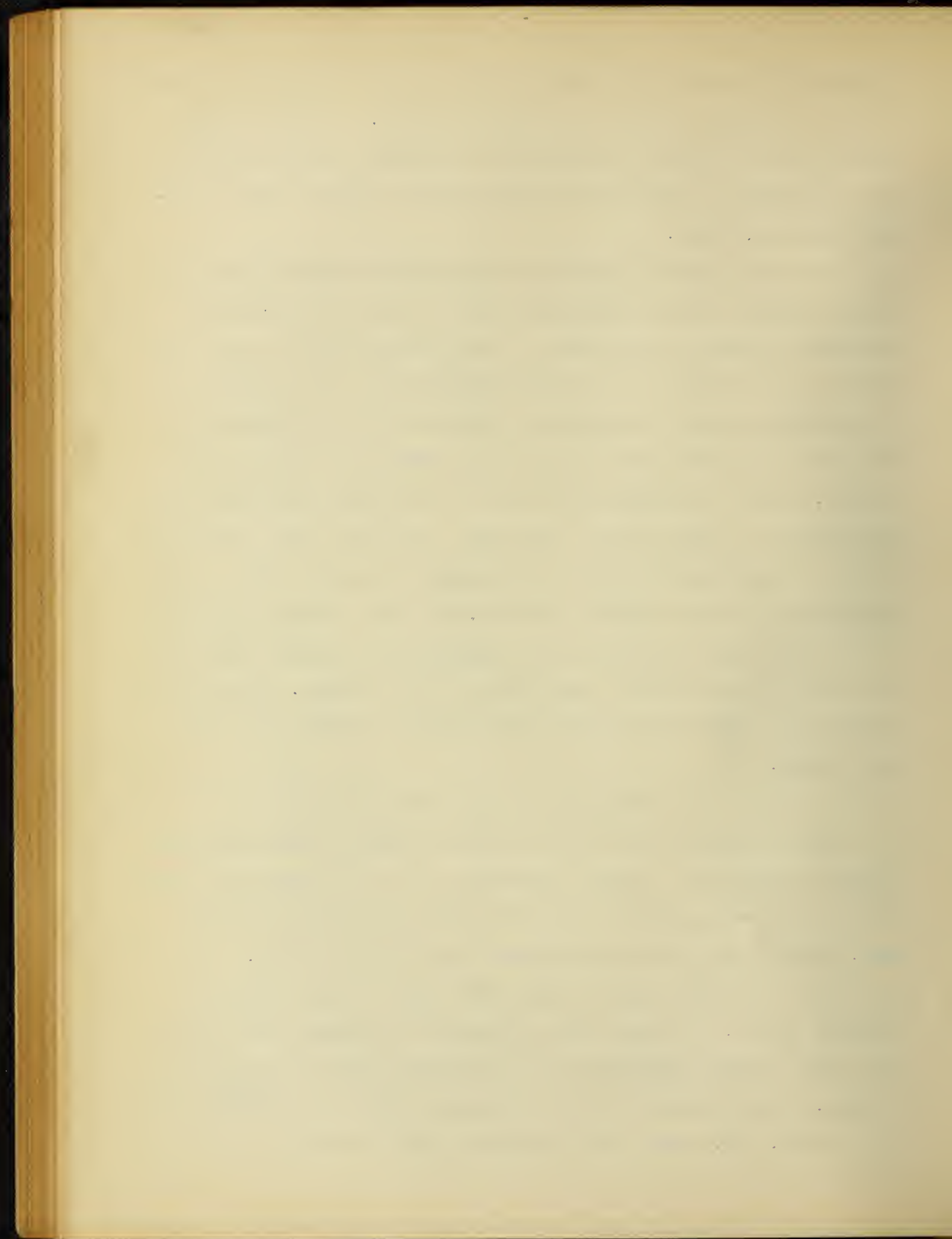
reading hall; between two stacks is left a little section or alcove in each of which a reading table can be placed. It goes without saying that with such an arrangement the reader is the least possible disturbed but that supervision over the reading room is rendered very difficult.

In various public libraries of England for dictionaries, encyclopedias and special reference books a special reading room (reference library) is provided. The books are placed around the walls, in the center of the rooms reading tables are arranged and at a suitable place, a platform is provided for the attendants. To use still better the considerable high space which a reading room demands, often in the upper part, one or two-storied galleries are built which are used to hold book cases. Although such a procedure is to be recommended in view of the economy of space, still on the other hand, it is not without consideration that during the winter in the upper part of the hall the temperature is usually high and the heat is very injurious especially to the bindings. Besides the books in the higher shelves are more exposed to dust than in the real stacks.

89. Description of some reading rooms.

A short description of some completed reading rooms will now follow the foregoing general discussion. Fig. 178 shows the ground plan of the reading room of the Bibliothèque nationale at Paris; figs. 179-80 give a cross section and interior view of it.

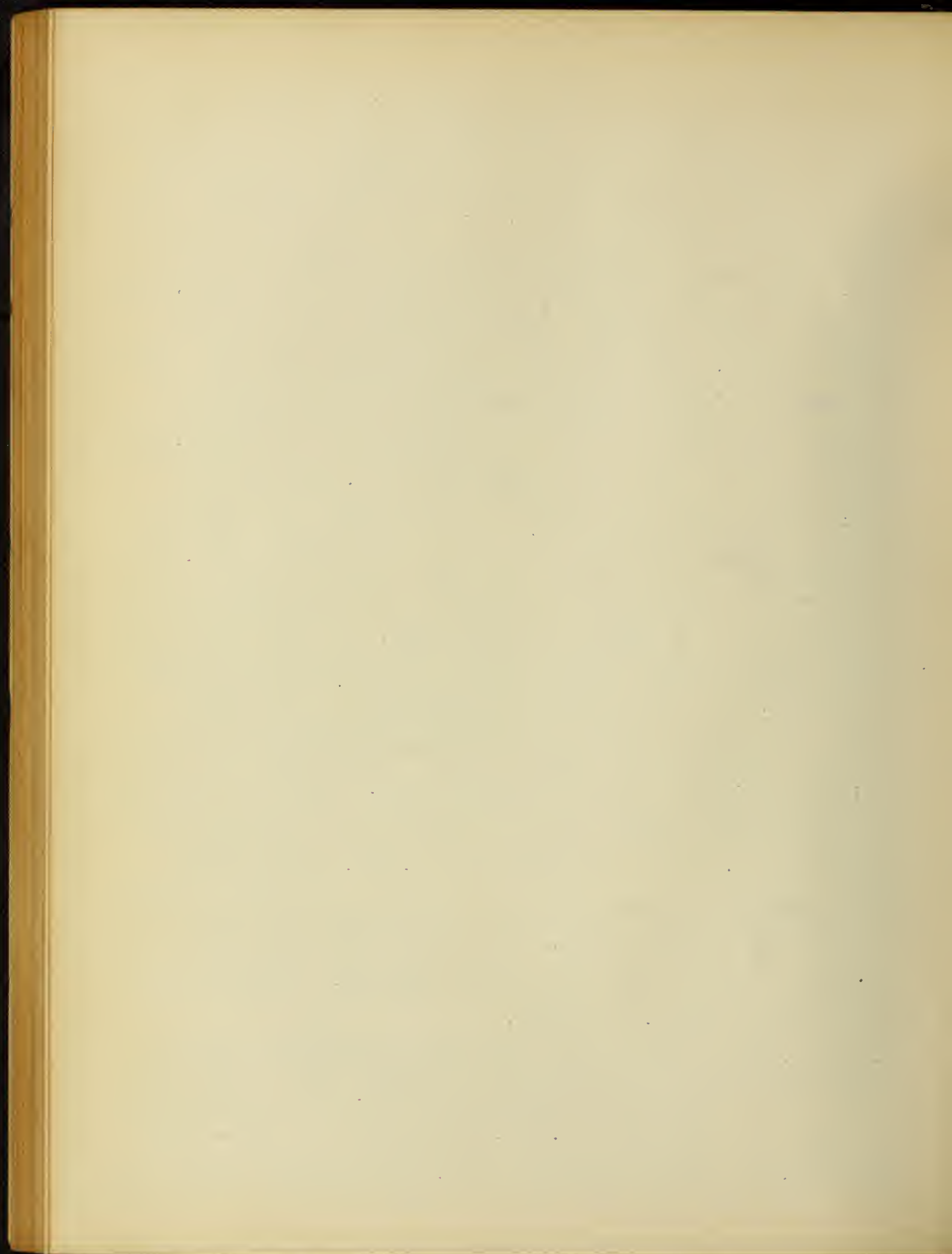
This hall has a floor area of about 1300 sqm and has a seating capacity of 344. The space for the public is several steps lower than that for the attendants and is separated from the latter by a railing. This division for the attendants called the "^{Hemi}line cycle" has 140 sqm. floor area and is connected with the stack room behind



71.

it by a large portal decorated with karyatids. The reading room is decorated with nine equally large spherical arches which are supported by 16 slender iron columns; 12 of these columns are against the walls and 4 in the center of the room. The light comes from a large window near the main entrance as well as from circular skylights of 4 in. diameter which are placed in the centers of the 9 arches; over the space for the attendants a special skylight half elliptical in shape is placed. The window area does not measure very much, still the lighting is ample since the domes of the 9 arches are made of brilliant tiles which reflect a considerable part of the light. The public enters the hall from the north side at b. where watch is kept; a broad passage long ways of the hall leads to the desk of the two attendants who attend to and watch the issue of books. This desk ~~comes~~^{curves} out from the place designated for the attendants; at the right and left of it stand the catalog cases. On both sides of the central passage stand 4 marble supports which are used to hold the large works; the tables are placed perpendicular to the central aisle and are marked with labels continuously throughout the alphabet; each place has its own particular number. Tables are provided with two reserved places. The reading tables have already been described in art. 115 and illustrated by fig. 162. On the two low sides between the pillars, shelving of a reasonable height is placed on which stand^d reference books. Close to the walls run stacks, access to which is shut off from the public by railings. In the galleries of the halls 80,000 v. are stored.

B. In fig. 181-83 ~~in~~ the general plan, cross sections and interior of the library of the British museum are shown. The circular reading room has a diameter of 42.67 m. floor area of 1354 sqm. height of 32.30m. and seating capacity of 364. In the center the place for the attendant is raised 46 in above the floor. This room is united



to the book room opposite the main entrance to the hall by a partitioned off passage. This slopes up to the attendants platform. Around the latter catalog tables are placed in two consecutive rows. From the latter the reading tables which have already been described in art. 85 radiate to the walls; they have a seating capacity of 302; tables and seats are numbered. Later smaller tables were placed between the main tables which increased the seating capacity to 364. These little tables are too narrow at the center of the hall, have no partitions and are less comfortable than the larger tables (see fig. 163-66.) Around the walls at a reachable height of 2.44m are the stacks for lexicons, encyclopedias and other reference works which are provided especially for the use of the public. This collection contains about 20,000 v. from all branches of knowledge . Above these stacks are placed two galleries which also contain cases; however these are not accessible from the hall but are in immediate connection with the stack room. The books placed here (40,000 in number) can be obtained in the evening by electric light when nothing is issued from the regular stacks. The lighting of the hall is effected by 20 windows 3.65m wide and 8.24 m. high which are built in the tambour of the rotunda and by a sky-light of 12 m. diameter.

C. The reading room of the library of the St. Geneviève, Paris (figs 184-85) has a double arrangement which forms a very beautiful and harmonious place. This hall has a grand area of 17.8 sqm and its reading tables seat 420. It is divided in the center by 18 pillars and between this book-cases 2.5 m. high are placed. On this account supervision from the place for the attendants is rendered difficult. The roof of the hall rests on iron beams which are supported by the pillars just mentioned. The walls are lined with books to a height

of 5 m. At a height of 2.5 m. runs a broad gallery with the minimum width of 2.5 m. Behind this between the abutments of the outer walls are little rooms which are used also for storing books. These are poorly lighted. Railings keep the public from using the books in the stacks. The positions of the attendants and as well as of the catalog were shown in fig. 184. In the hall 100, 000 v. are placed. It is lighted from high side windows.

D. Among the university libraries the reading room of the one at Budapest is shown in fig. 186-87. This affords place for 180 readers; it is lighted by side and sky lights. Around the wall in deep cases the collection of the most used works is placed; it contains about 12,000 v. The wall above them is decorated with frescoes. The broad ceiling cave intersected by compartments which surrounds the large sky light is decorated with painted ⁵⁵spandrel figures representing arts and knowledge under which project portrait medallions.

E. The reading room of the University library at Vienna (fig. 188-89) shows an arrangement of a library in a University building especially the entrance and neighboring rooms. The hall is 46.2 m. long, and at each end is divided by arcades which extend a short distance from the wall lengthwise of the hall. Two-storied galleries which have a capacity of 50,000 v. line the room. It is mainly lighted by sky light. This hall affords 400 reading places which is only possible on account of the narrowness of the reading tables (95 m.)

F. A picture of the reading room of the new university library at Leipzig (see fig. 71) is shown by fig. 190. This has a seating capacity of 200, is lighted in its semi circular part by high side lights and in the other part by sky light.

G. The foregoing examples belong mostly to the larger libraries. The library of the London institution is ranked among the plans of smaller libraries. The reading room which occupies the whole upper story of the building and serves also as a stack room is shown in fig. 191. This 29.56 m. long 12 m. wide and 8.53 m. high. This is peculiar by the separation by cross partitions into small rooms which serve partly to hold books and partly as secluded work places.

The reading room of the University library at Göttingen with the adjacent rooms is shown in figs. 192-93. The floor area of the reading room is only 237.91 sqm; 56 such places are provided at the 4 reading tables. These have to be placed in the center of the room since galleries are necessary to hold the necessary reference works; these are supported only by the small book cases placed against the walls. Under such conditions light from the side was not enough and a sky light of 54.38 sqm.area was constructed. For the attendants of the reading room a raised platform was provided besides the reading tables with fixed tops; still other tables with marble tops for holding heavy books in slanting positions were supplied(see fig. 169-70).

I. In fig. 194 is given the ground plan of the reading room of the University library at Halle. In this are 5 reading tables of dark grained oak 5 m. long and 1.25 m. wide. These are supported by 8 strong carved legs-- At a distance of 17 cm. under the top (5 cm. thick) is a small place to hold the head covering of the readers. Every table seats 10 people. One of the tables is set apart for the use of valuable engravings; on these tables there are no ink wells, however, there are small supports on which the largest sizes can be handled. The chairs are also made of dark grained oak with polished American veneering. The walls at both sides of the entrance ^{are} ~~is~~ lined

with book cases of brown grained oak, which contain a select library consisting of dictionaries, encyclopedias and special reference works. At the middle of the south wall the desks of the attendants are arranged, at both sides of which are tables which serve as a temporary place for books returned by the readers. The floor is constructed of oak strips which are laid in asphalt on a brick foundations. The passage between the tables and the books which is most used is covered with cork carpet.

90. Heating.

In art. 103 the heating of the entire extent of the library will be discussed. In this art. it will only be shown that every reading room which is used in winter is to be provided with adequate heating apparatus. Heating with which ventilation is connected is the most profitable. The reading room of the Bibliothèque Nationale at Paris is heated by hot air which is conveyed through 24 openings in the walls of the upper gallery. Large urn shaped water basins which are placed in arched niches serve to moisten the air. In the reading room of the library of the British Museum at London hot air is also used. The hot air is conveyed by pressure through channels under the floor of the hall which, according to the position of the tables radiate under the stone floor; it comes forth through openings protected with gratings in the foot stalls of the tables. In the same way the air is conveyed through the central catalog tables. In this room which is higher than 32 m. the air rises so swiftly that the sensation of a draught is felt. Besides the books placed on the upper galleries suffer from the ascending hot air. In some cases the heating pipes are brought under the reading tables so that the reader can put his feet on them. However, such an arrangement is disagreeable to the public, besides an unpleasant odor arises from the warm shoe leather.

The first part of the paper is devoted to a general discussion of the problem. It is shown that the problem is of great importance in the theory of the differential equations of the second order. The second part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order.

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91-- Other hygienic arrangements.

It is not enough to so construct and arrange a reading room that it fulfills the technical conditions which originate with its aim, but it must also in the most adequate ^{way} fulfill hygienic requirements. To that before all else belongs the arrangements already described for ventilating and heating and for the most favorable and extensive system of lighting. All is to be avoided that is injurious to the health of the readers, particularly all that blinds the eye of the reader or has a bad effect in any other way. From the latter point of view the choice of colors for the walls, ceilings and tables is to be considered.

92-- Small reading rooms.

For the use of periodicals, news-papers, pamphlets etc. it is best in the large libraries to build a special room besides the regular reading room, and if possible connected with it, in which the periodicals can be kept. In University libraries there is usually a special reading room for use of professors and other scholars. The news-papers etc. are either brought into the reading room in the same condition in which they are issued or they are stitched loosely; sometimes protected with coverings or in some other way preserved from injury or accident. In richly endowed libraries for each periodical a special reading room is provided in which is kept continually the latest number, the latest part etc. The preceding numbers, parts, etc. are kept in cases which are arranged the wall of the special room in which they stay until a year ^{or} a volume is complete and they can be bound. In small libraries these cases and a reading table are only provided. When any one wants to read a periodical, he must get it from the case, then take it to the table to peruse and then return it to the case after using it. The cases in question are constructed after the pattern of those in use in public reading rooms and periodi-

cal rooms. Open cases are built whose depth runs up to 50 m. According to whether newspapers are to be placed in it upright or on the sides, the width and height of the pigeon holes is determined. If they are on their sides the size of the periodical is the size of the pigeon hole; 20 to 25 cm. height is usually enough. If the periodicals, usually unbound, are to be placed upright in the pigeon hole, then the height of the periodical determines their height. The width need not be more than 8.1 cm.

In the public libraries of England and America a special reading room for women is frequently provided and sometimes such a one for boys and one for girls.

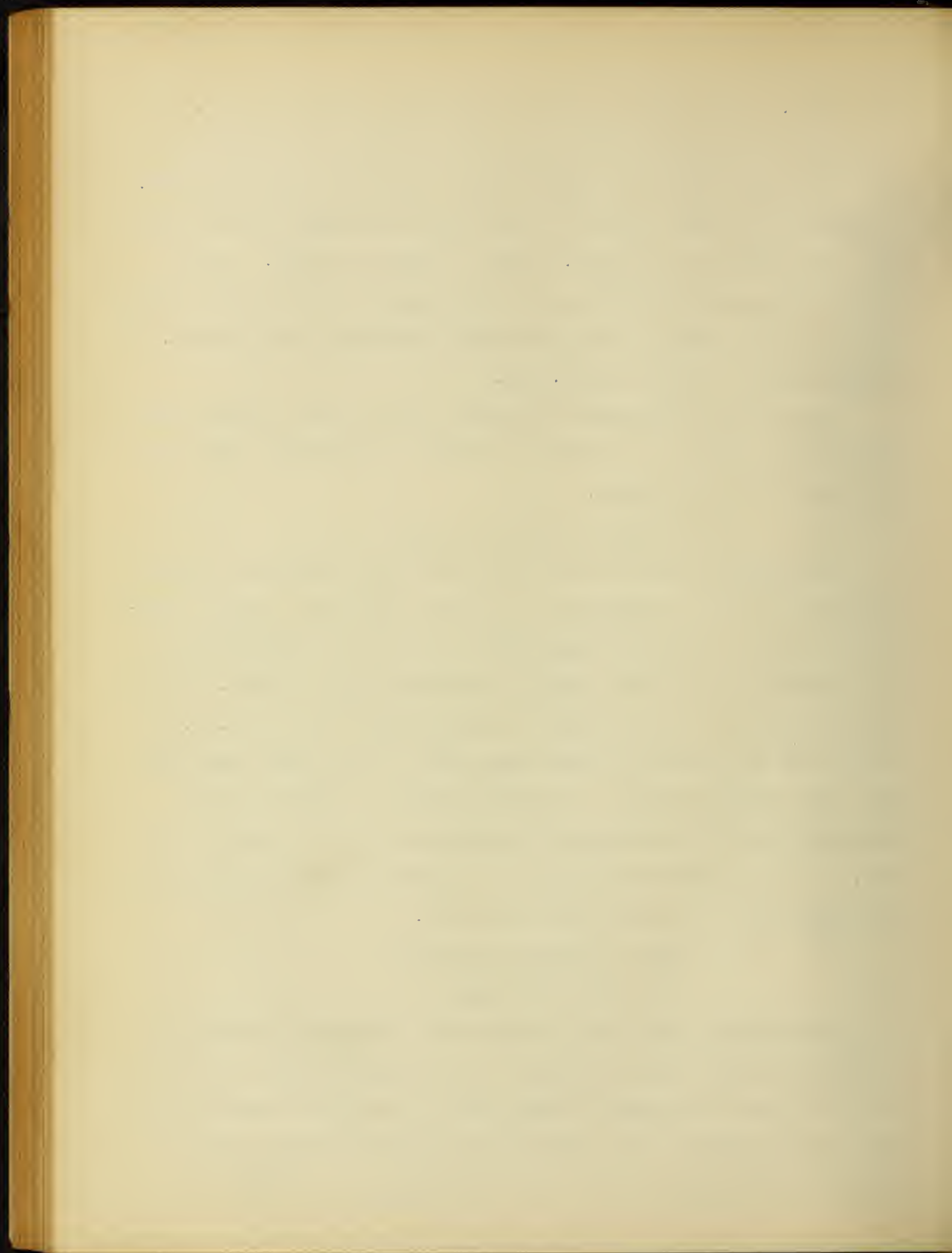
93. American periodical rooms.

As is to be seen from the foregoing special rooms for periodicals do not play a very great role in any libraries. This is different in the English and especially in the American libraries in the largest of which many hundred periodicals are provided. In the periodical room in Boston which is opened daily until 10 p. m. in 1880, over 800 periodicals were subscribed for and these were used by a half million readers. Cooper's library in London in 1880 supplied over 300 periodicals which were used by over 400,000 readers. In 1890 Leeds showed 1,300,000 patrons of the periodical room and Manchester in the same year 3,000,000.

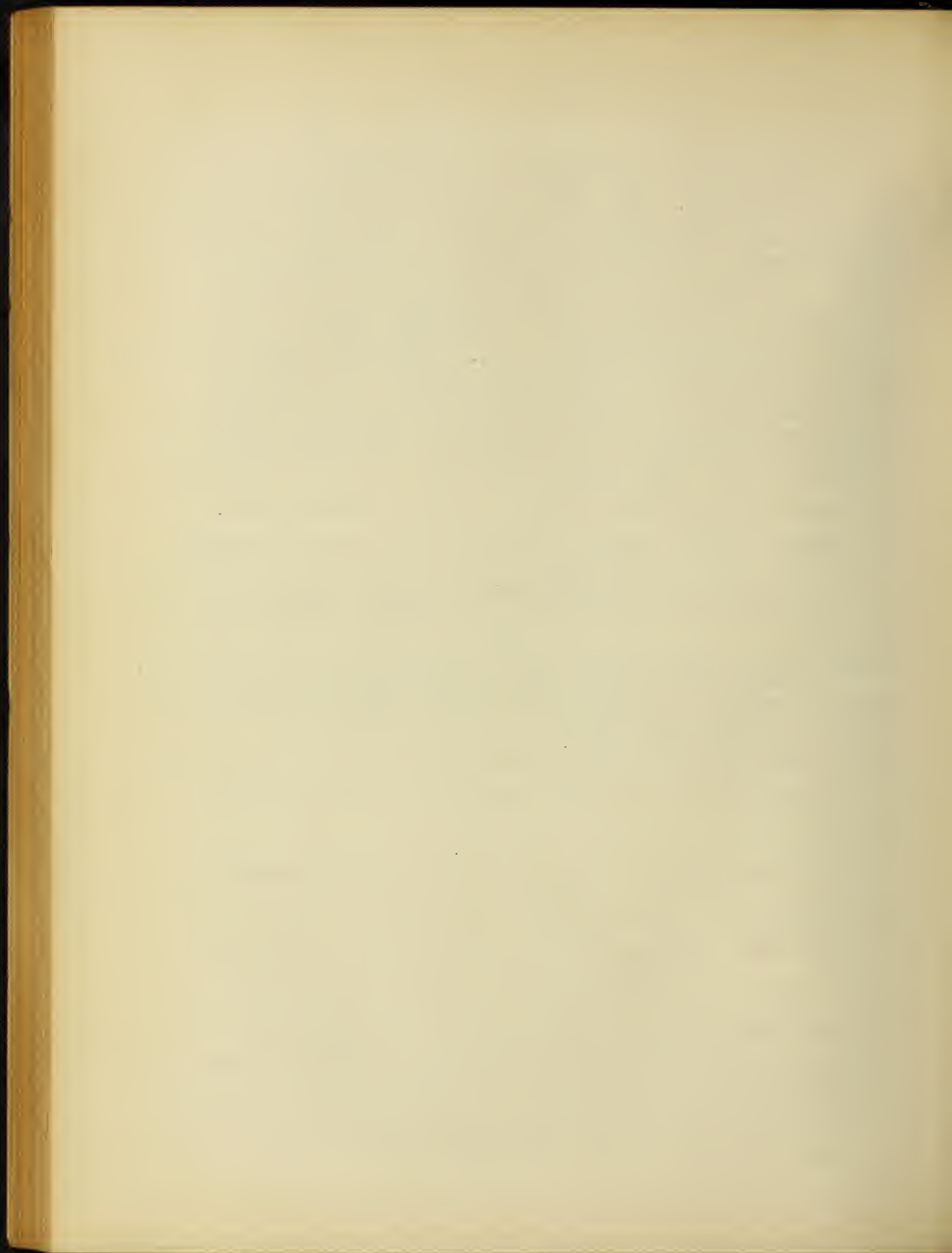
4) Other rooms for the public.

94. Delivery rooms.

The delivery room should always even in the smaller libraries be separated from the work rooms of the attendants, else the latter will be greatly disturbed in their work. They must be easy of access to the users of the library as well as constructed with the greatest proportions so that they will always be sufficient for



the greatest crowds especially on the days of general return and issue of books. First of all in the delivery room the separation of the public from the attendants at the loan desk is to be taken into consideration. The simplest and most customary way of carrying this out is by a railing. In front of this railing well-lighted tables and desks as well as some seats for the public are to be provided; if the catalog is to be accessible special care must be taken for the position and use of it. Behind the railing some cases are to be constructed for the books returned or to be issued, also a place for writing must not be lacking. To hold the various cards divided cases are to be highly recommended which are constructed in the same way as the ones serving to hold the catalog cards. In the largest library a special adjoining room for the attendants at the loan desk is to be provided; in smaller libraries some times the delivery room is connected with the reading rooms. The two rooms are then separated by a glass partition or some similar way. When the crowd in the reading room is not large an attendant can oversee and serve both rooms.



95-- Other rooms.

The public libraries in England and especially those in the larger North American cities only partially deserve the name library because not only extensive collections of books are in them for free use, but also learning is advanced by the holding of lectures the intellect is influenced-- and love of the beautiful nourished by exhibitions of paintings and sculpture, by giving instructions in art and by concerts. To serve this purpose exhibition rooms, music rooms, etc. are necessary. Near the entrance of the reading room toilet rooms should be built, in the same place a rooms with towels etc. should be provided as the hands generally have to be washed after using the books.

5 Administration rooms.

96 Necessary rooms.

In large libraries the following rooms are necessary for administration.

1. The director's room, office and reception room.
2. The clerk's office or order room, in which not only that work is carried on which is indicated by the name of the room but the accession book is also kept in which all newly received books are entered.
3. The exhibition room in which the newly received books are placed after they have been accessioned. Here they remain some time for inspection. Continuations remain here until the series is complete, that is, is ready to be bound. This room must stand in close relation to the other two rooms, it is best if it can be connected with them. In smaller libraries for the same purpose, a special place in the reading room or in the attendant's room is provided.
4. The bindery. Small libraries do not have their own bindery. The binding is done outside.

5. The printing room in which the various labels, stamps, catalogs, etc. are printed. Only a few libraries possess such a press.

6. Some other work rooms for the custodian and other attendants in which the most of the administration is carried on, particularly the cataloging of books as soon as they are brought from the bindery and placed in the stacks.

7. The catalog room in which there is a place for the catalog. Sometimes the cataloging is done in this room.

8. Packing room, closets for tools packing material etc.

Most large libraries since the beginning of this century have a system of inter-library loans; where much use is made of this a special room must be provided to keep the books loaned in this way, or at least a special place must be set apart in the administration rooms.

97 Catalog room.

The most difficult and important work of the staff consists of the arrangement of the catalog. This is done in different ways in individual libraries. For every library many different records and catalogs are demanded. It depends first of all on the smaller or greater extent of the collection whether the catalog may be a simple one or a larger and more comprehensive. Any library generally needs three kinds of a catalog.

1. An alphabetical or author catalog in which the books are entered alphabetically by authors etc.

2. A class or place catalog in which the books are entered in the order in which they stand on the shelves.

3. A subject catalog also called a systematic catalog in which the books are entered according to their contents. Besides these three general or universal catalogs, especially lately, some libraries have begun.

4. A general alphanabetico-subject catalog strongly recommended in which all subjects of which the works of the library treat are placed in alphabetical order and under each subject the titles of the works in question--A.

Sometimes in addition there are.

5. Special catalogs for engravings music, manuscript , etc. also for duplicates.

The catalogs are either made as card catalogs are written in book form. Only a few libraries are in a position to own printed catalogs of their collections or of the individual groups.

Experience has shown that the use of the catalog by the public is of slight value, but putting aside the fact that it is difficult for the laity it will always be the task of the library attendants to test the position of the catalog in the delivery or reading room near the public and finally to keep it up to date. Since written catalogs on account of their value are not willingly given over to public use, only small libraries will be in a position to place catalogs in the delivery room as well as in the reading room. Usually room for placing a catalog is not taken into consideration in the measurements of the delivery and reading rooms. On account of the importance of the catalog for the administration of every library and the necessity of keeping it up-to-date, it is necessary to provide for a special space for the catalogues and for the reception of the catalog. It is recommended that this room be brought in the closest possible relation with the other administration rooms and with the reading room. In the catalog room first of all a considerable number of work places for the catalogues are to be provided and the necessary cases for holding the catalog. A large number of libraries have a catalog only on cards, some have it in book form as well as on cards; on this will depend the construction of the cases just mentioned .

The following is a list of the names of the persons who have been elected to the office of the President of the United States, from the year 1789 to the present time. The names are given in the order in which they were elected, and the year of their election is given in parentheses. The names are given in the order in which they were elected, and the year of their election is given in parentheses.

George Washington (1789)
John Adams (1797)
Thomas Jefferson (1801)
James Madison (1809)
James Monroe (1817)
John Quincy Adams (1825)
Andrew Jackson (1829)
Martin Van Buren (1837)
William Henry Harrison (1841)
John Tyler (1845)
Franklin Pierce (1853)
James Buchanan (1857)
Abraham Lincoln (1861)
Andrew Johnson (1865)
Ulysses S. Grant (1869)
Rutherford B. Hayes (1877)
James A. Garfield (1881)
Chester A. Arthur (1881)
Grover Cleveland (1885)
Benjamin Harrison (1889)
William McKinley (1897)
Theodore Roosevelt (1901)
William Howard Taft (1909)
Woodrow Wilson (1913)
Warren G. Harding (1921)
Calvin Coolidge (1925)
Herbert Hoover (1929)
Franklin D. Roosevelt (1933)
Dwight D. Eisenhower (1953)
John F. Kennedy (1961)
Lyndon B. Johnson (1963)
Richard M. Nixon (1969)
Jimmy Carter (1977)
Ronald Reagan (1981)
George H. W. Bush (1989)
Bill Clinton (1993)
George W. Bush (2001)
Barack Obama (2009)
Donald Trump (2017)

The preference for the card system rests upon the possibilities of moving the cards; for by that is not only the power offered to keep permanently exact the complete catalog, be it alphabetical or subject, and in that way keeping it up to date, but when necessity demands to easily and swiftly change the old arrangement to a new one. However, there is the danger that the loose cards by use will be disarranged, lost or stolen. It is true that the book catalog avoids this but instead of that it constitutes in itself the greatest failing that although at the beginning extensive plans were left for additions after a short time an interruption in the entire arrangement will be necessary for new titles or the want of space for these will be exhibited.

In figs. 197 to 198 supports are shown which serve to hold the catalogs kept in book form; these supports guarantee the possibility of using the largest and heaviest volumes on the spot. To protect these large heavy volumes and also the case from injury, all wood work is to be covered with leather. The largest possible size of cards is used for the card catalog so as to be able to give full imprint for each book. For keeping these cards special cases are necessary, whose arrangement is of such a kind that the cards may be swiftly and safely consulted as well as conveniently taken out and put in. The first point is of the greatest importance since the security of administration of the library depends upon the order of the catalog. According to the kind of administration of a library, that is whether accessibility to the catalog is allowed to one or all the attendants, care must be taken for keeping the card catalog completely or only slightly under lock and key. According to these conditions an open or closed case will be constructed. Fig. 199 shows the arrangement of a card catalog case, which is not to be locked and which originated at the

University library at Leyden. The upper trays (b) are fixed; (a) are sliding drawers which run through the entire width of the stack and are divided in the center; both sides are arranged to hold cards; to take them out from the heavy case is made possible by this arrangement. The trays themselves are made of wood; at the front end of these are slits in which zinc labels can be inserted from above to indicate the contents of the trays. The spaces (d) underneath are for holding books. A similar construction was carried out at the University Library at Göttingen (fig. 200) but with the exception that the trays had to be booked. The use of the sliding is double, underneath the bottom of the drawer at b is a spring which when the drawer is pulled out presses against the back of the drawer and keeps it from falling out. If the spring is bent down from above with the hand, the drawer can be pulled clear out.

Since the card catalog as well as the book catalog has not only certain advantages but also certain faults, great pains have been taken to find a kind of catalog which should unite the advantages of the two systems and also avoid the faults. This appears to have been accomplished first in the Holland libraries in such a way that the cards were held together in a kind of binding so that they could be freed and taken out at any time or put in and fastened together. Cords were used to hold them together which were slipped through holes in the binder and cards. The Sacconi system which has screws instead of cord followed the same plan; then came the French *reliures de furete* and the Bonnange catalog card case both with perpetual screws, later the Stadermi system with notched metal rods, spring and screw; finally the trays with perforated cards and metal rods to run through them which are used at the library of the Genevieve at Paris and at the Guildhall at London. However most of these systems allow a moderately

quick use of the card. In many libraries the cards are fastened together in groups with leather bands and the package kept in the cases. It is self evident that the cases and trays must be adjusted to the kind of catalog used in the library in question.

98-- Other work rooms.

As regards the other work rooms set aside for the public, the north exposure is favored for administration rooms because it affords the best light; However it is hard to heat it in winter in such a position. Besides the arrangements for heating, provision should be made for repeated changing of air to counteract the powerful influence of the dust from the books. In these work rooms strongly constructed movable tables are to be placed if possible racks for holding books. Some supports are also to be provided and along the walls cases are to be placed on which the Bibliographical ^{aids} necessary for the order department are to be placed; those are more numerous, the larger the library.

In the arrangement of the trustee's rooms it is to be taken into consideration that it is to be used frequently.

d) Details of constructing and fittings.

99. Precautions against fire. In choosing construction materials of the interior of a library building and the fittings for the various rooms, the main point to be considered is that the collection of books be protected in as great a degree as possible from fire, dampness, and all other harmful influences. To ward off danger from fire the extensive use of iron for supports, floors and roofs is to be recommended for the rest wood if possible is to be avoided and only stone used in construction.

100 --Dampness and dust.

To keep dampness from the books, first of all the customary precautions are to be taken against dampness arising from the floor, the principal ways are the plans for repeated renewal of air and the heat of the entire library. In Vitrov's dissertation on the plans of a library (lib 6. chap. 4) the security from fire was discussed.

" Cubricula et bibliothecae ad orientem spectare debent, usus enim matutinum postulat lumen item in bibliothecis libri non putrescent, nam quaecumque ad meridiem et occidentem spectant, a tineis et humore vitiantur, quod venti humidi advenientes procreant eas et alunt infundentes humidos spiritus, calore volumina corrumpunt."

Leaving out of the questions the means before mentioned to guard against dampness from the floor, the cellar under the building must be well adapted to counteract the worst enemy to books. When such a cellar is not possible or for special reasons is not desirable at least a hollow chamber must be providing running under the ground floor for the good ventilation of which care must be taken. The building of the University library at Halle has a cellar only under a small part of it. Under the part of the building where there is no cellar a hollow chamber of 80 cm. height is built the ventilating of which is effected by the help of the heating plant. Part of the book room in the new building of the Technical high school at Darmstadt is situated in the foundation for the purpose of cutting off the dampness from the ground, a hollow chamber of 90 cm. height was constructed under it.

101-- The floors.

To guard against fire wood floors should if practical be avoided; where such can not be evaded, they are laid in asphalt. Often asphalt, gypsum or cement are used, under certain conditions metal floors or cement ones are constructed.

Where the purpose of the room demands it linoleum or ~~camptulism~~^{con} is used. In the new University library at Leipzig all the floors are laid of cement, in the reading room and in the administration rooms the cement is covered with linoleum. The stack of the University at Bonn just built in 1890 has a cement floor. The floors of the reading rooms were also discussed under c, 3, (art. 8.)

102. Artificial light.

Many libraries are only open for use in day time partly to avoid danger of fire in the arrangement of artificial light and partly to decrease the number of the staff. In order to make possible the use of the library in the most extensive way, it should be made accessible especially at winter in the evenings, then arrangements for artificial light are necessary. In former times gas was used principally which was the case in the library in St. Geneviève at Paris, the library of the New record office at London and the Guildhall library of the City of London, etc. At the present electric light alone enters into the question which has been in use for a long time in the library of the British Museum at London in the Bibliothèque Nationale at Paris, in the Royal library at Berlin and in many other libraries. The university library at Leipzig built during the years 1888-91 was provided with gas but only in the reading rooms, the stair halls and corridors. Artificial light is universally unfavorable for libraries especially for the book rooms. Gas harms the bindings because it raises the temperature. A committee appointed found in one of the public libraries at Birmingham that leather that was exposed to the impure air of a room in which gas burned for 1000 hours had suffered considerably, since its pliability had been lessened from 10 to 15 per cent, while pressure it could stand decreased in a proportion of 35 to 17. Even electric light does not appear to

be without its disadvantages. Weisner claims to have found that this causes the paper to turn yellow which is made by an oxidation process. Under all circumstances the entrances and exits, the stair ways and passages are to be provided with fixtures for artificial light which can be set in operation in case of danger. For this purpose in the Munich library at the counters and stairs near the fire oil lamps are placed whose working powers are tested every week. In the University library at Göttingen oil lamps are placed on the stairs and at the attic lanterns with sperm candles are provided. For unprecedented emergencies it is recommended that sperm lanterns be ready in suitable places in the book rooms and attic in a way convenient for the use of the fire -brigade.

103-- Ventilation & Heating.

As has already been stated many times extensive ventilation as well as an even temperature as possible is necessary for the proper preservation of the books. Therefore it is important to take care for a dust free system of ventilation and a method of heating which does not increase the dust. The rooms for the public and the administration without exception need a heating apparatus whether the book rooms shall be heated in the winter depends upon local conditions and upon the use to which the library in question is put. In regard to the heating of the book rooms, stories with closed floors are more favorable than stack rooms in which 5 or 6 stories arranged above one another with penetrated iron entresols prevent a uniform heating of the rooms. Many book rooms are not heated at all, for example, those in the Grand ducal court and state library at Darmstadt, those in the Royal library at Stuttgart and at Stockholm, those in the University library at Rostock and in the new Ducal library at Wolfenbüttel, etc. The heating of the reading room has already been discussed under c, 3, (art. 90) In many libraries ~~are~~

artificial heating of the floor will be necessary. Under certain circumstances the gases arising from the floor can be drawn away from the reading room easily and cheaply.

104 Lightning rods, fire-escapes etc.

An extensive system of lightning rods should never be wanting. The farther the library stands from other buildings the greater attention must be paid to this in the plans, construction and maintenance. In stack libraries a strong frame work of iron is usually constructed. On that account special precaution and care is necessary in placing the lightning rods. In Helmholtz's opinion unnecessary pains would be taken to place a conductor on the outside of a building which this problem concerns to some extent on account of the extensive iron construction in the interior. The cast iron pillars which reach from the ground to the roof and are united by iron beams have a considerable conducting power so that, no matter how many copper rods or cables are placed on the outside of the building, there is always the danger that the electric bolt will jump over into the interior of the building. For this reason it is recommended in many cases to dispense with all outside conductors and to use the iron frame work itself for a conductor of lightning bolts. When the electric current finds a good conductor, its destroying power is not to be feared. With such arrangements care must be taken on the one hand to conduct the lightning in a good way through the iron construction and on the other hand to place the latter in close connection with the earth. In such a way they have been managed in the new building of the University library at Halle. On the roof of this building at the highest point is placed in a central position a sky light constructed of wood rafters. This with its wood frame was enclosed in an iron construction in such a way that four strong connecting rods were secured at one end to the lower surface of the frame work of the sky light and at the other end to

cast iron roof supports. At the outside of the sky light are two rods with platina points. In the plan for a ground conductor not all the pillars provided in the ground floor were connected with the ground, but three of them were chosen which with metal connections continued the conducting system to the attic without being interrupted by masonry. These pillars at their bases are fitted with shining metal wound many times with copper cords and the latter are directed to such places on the cellar beams where sources for carrying out the foundation of the work have been indicated. At these places copper ground plates are sunk. Care is to be taken for well distributed fire escapes in the immediate surroundings of the library and the outside of the building as well as in the interior. Recently in more extensive plans speak^{ing}-tubes are arranged which bring the more important rooms into close connection.

e. Examples

1-- State and National Libraries.

In the foregoing a great number of state and national libraries have been considered, the Royal Library at Berlin in art. 53, the National library at Washington in art. 46, the Imperial public library at St. Petersburg in art. 43, the Ducal library at Wolfenbüttel in arts. 46 & 50, the Bibliothèque royale at Brussels in art. 72, & 77 etc. In the following some libraries of which something already has been said shall be described in detail in the order in which they were built.

105-- Example 1.

The "Staat und Landes" library at Munich, which has already been mentioned in art. 43, occupies the two upper stories of the building erected by Von Gartner, 1832-43, in whose lower story the archives of the kingdom are kept. The latter has already been

discussed in a preceding chapter and the whole plan with its main features described. The plan of the second story is given in fig. 50 the third story contains merely the book hall 201 gives a cross-section of the stacks. To this plan the following is to be added. Adorned with the facade of Florentine architecture in large proportions the building encloses two large inner courts. The administration rooms directly join the massive stair ways of the building. The book hall which contains over 1,300,000v. are very spacious. On account of this considerable of 8m. two wood galleries are constructed above each other lining all walls. (fig. 201) The stairways between the two halls at one side of the massive partition walls are lined with book cases. Since the galleries have a height of only 2.2m ladders are not necessary. The spacious impression of the book hall is magnificent. Since the stacks are only placed around the outer walls the arrangement is very extensive, economy of space poor and administration very difficult. The readingroom with no consideration of its seemingly great depth has light from only one side so that it is not adequately lighted. Also its position is not very favorable because it must be used as a passage to both side corridors and to the attendant's rooms. The administration rooms and the delivery room are not connected with the store rooms and reading rooms in an especially suitable way.

106-- Example 2.

Fig. 184 shows the plans of the upper story of the library of the St. Geneviève built by Labrouste in 1843-50, which contains the contains the great reading room; fig 62, the plan of the ground floor serving namely as a book room and fig. 185 a a cross section of the entire building. In the latter the large richly decorated entrance hall is visible. The book stacks reach from the floor to the roof in an unbroken line. They are ascended by sliding ladders with a

run of 36 m., width of .55 m. and a height of 2.2 m. which run parallel to the stacks. The four ~~which are~~^{wheels} at the bottom are 6.5 cm. in diameter and are made of wood. The two ~~which~~^{wheels} nearest the stack run on an iron rod, the other two on the cement floor. The ladder at the top has a jack-shaped guide which fastens over an iron rod. For every stack a special ladder is needed. The reading room of this library has already been described in art. 89. This is joined to the stacks underneath by two little spiral stairs which are very inconvenient for service. The administration rooms are placed in a neighboring building. The exhibition cases were mentioned in art. 78. The whole arrangement of this library building is peculiar; in the entire plan as well as in the upper story is used very disadvantageously. As a result of the spacious and uneconomical plan of the reading room it was impossible to build special book rooms in this story. The facade system illustrated in fig. 83.

107. Example 3.

The library of the British Museum at London forms ~~of~~ a part of the entire government collections of England which is divided into twelve parts. In a preceding plate is given the plan of the ground floor and intermediate floors of the buildings erected during 1822-47, which shelters a greater part of the collection at the present time; this building is discussed under B. (in chap 8) The rooms which belong to the library are designated by shading. As the need to increase the space for storing books and to create a large reading room grew more and more imperative, the large inner court was used to construct a large extension. (see art. 45) The originator of this idea was Panizzi at that time head librarian; the plan was started by the architect of the British Museum, Robert Smirke and after his death brought to completion by his brother Sidney Smirke.

The extension was completed in 1856. An entirely new wing was erected on the south side of the building after 1879. This principally contains the rooms for manuscripts, parliamentary documents, etc. The library rooms of the original plans contain in hall 4, the library of Thomas Grenville (2 b, 240 v.) in hall 5, manuscripts and in hall 6, expressly planned and built with that intention, the King's library a collection of 80,000 beautiful and rare ^{edited,} collected by George III. and given to the nation by George ~~III~~^{IV}. The original arrangement of all these rooms is still in use and on the walls are stacks which are ascended by ladders. At a distance of from 8.2 m. to 9 m. from the walls of the great inner court the extension was erected; in the center is the newly constructed reading room, dome shape, of 42.67 m. diameter and 32.3 m. height. This has already been discussed in art. 89 and illustrated in figs. 181-183. The construction and arrangement of the book rooms surrounding it which are built are built according to the stack system is original and suitable. The distance between the two cases of stacks from center to center is 2.44 m. three intermediate floors are built also above each other at distances of 2.44 m. They are constructed of iron frame work covered with interrupted metal plates. Four upright iron posts support the frame work for the depth of a double stack which forms the foundation for the next upper story. Along the stacks is a light shaft of 2 cm. width which lets the light enter abundantly from above. To guard against a person's stepping through the

openings wire netting is stretched only this to a height of 27 m. from the floor. In order to reach the upper shelves conveniently steps are used which have been shown in fig. 118 and which slide easily along the floor. Various other peculiarities have been given in foregoing places.

108. Example 4.

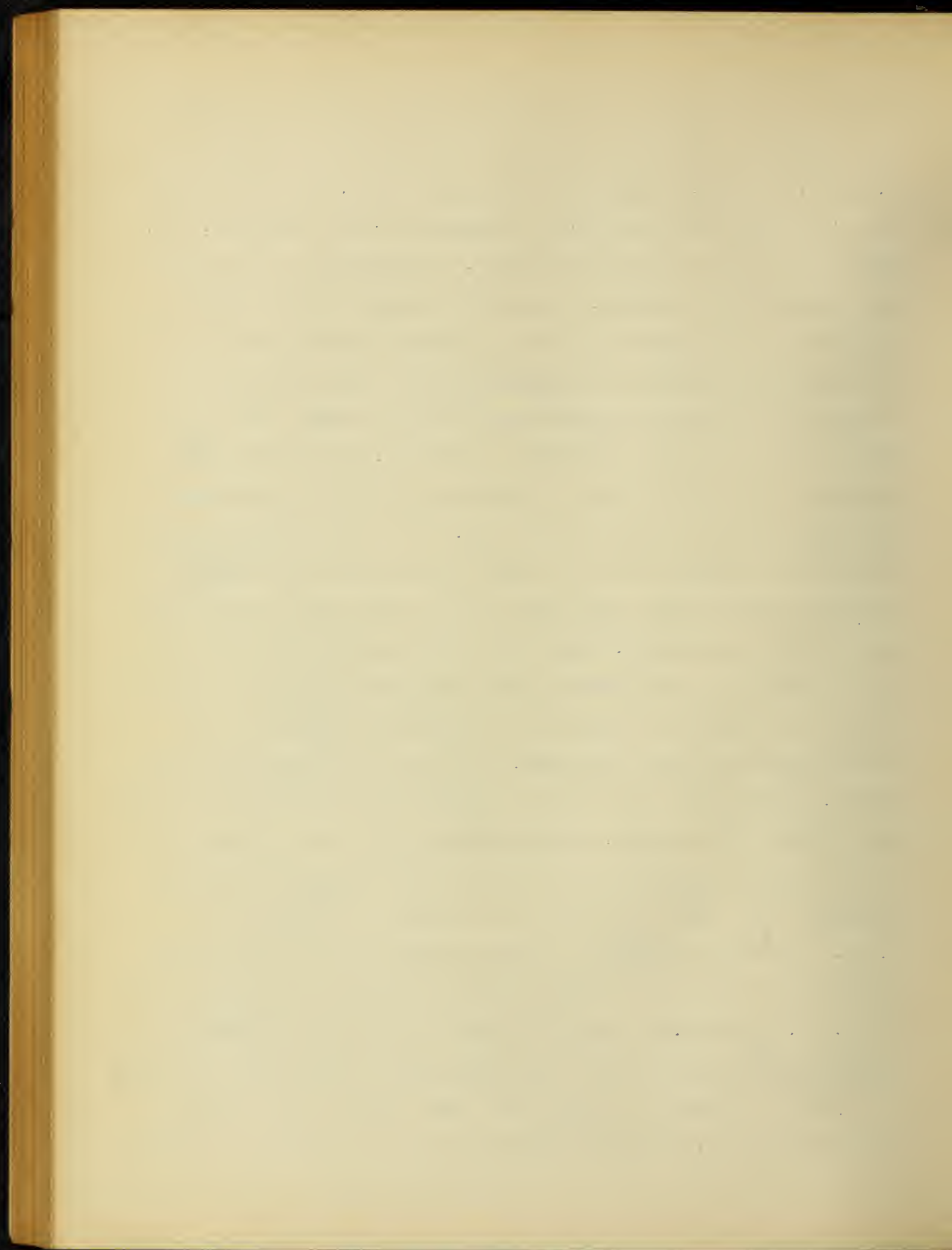
The Bibliothèque Nationale (formerly the Bibliothèque imperiale) at Paris as has already been stated in art. 45 has been located in the Hotel Mazarin since 1724 and in the successive extensions to that building, (see the plan in fig. 67) Visconti's plans which were to be followed in the last extension were only partly carried out and Labrousse undertook the contract in 1854 -75 after Visconti's death and to him belongs the credit of the large reading room and the large stack room. The large reading room which has already been described in art. 89 as well as illustrated by the ground plan and cross section added there was built 1859-67. It occupies a central position so that it is most convenient for service and most removed from the noise streets. The special libraries are very extensive. The books number about 3,000,000 v. the manuscripts about 150,000 pieces; the geographical library contains 300,000 maps, charts, etc. the collection of engravings consists of 8,000 v. and 1,000,000 plates. The yearly increase is about 50,000 v. With this enormous collection the library is divided into parts like the library of the British Museum at London, printed books, maps, and the rest of the geographical collections, manuscripts, medallions, antiquities and engravings. From the reading room one immediately enters the large stack room which was erected after the example of the British Museum of London and contains 2,000,000 v. A frame work of iron columns with a main axis of 3 to 3.21 m. in the 5 succeeding stories of 2.3 m. height support the cross beams of wrought iron, with the interrupted cast iron intermediate floors which are laid upon them. The lowest story lies underneath the entrance to the attendant's rooms and permits no elevation over the reading room. In the basement room just mentioned are placed two aisles which lead to the lifts in the shafts behind the attendant's rooms. A passage in the

center serves as a work room in which work tables are constructed and at both sides of which stairways as well as little lifts are provided . The depth for a double stack is 80cm. the stacks and shelves are made of wood; every main axis of the stack is three-fold so that for every space the length is 1.07 m. from center to center. The openings in the cast iron plates of which the intermediate floors are constructed (see fig 115) where a cross section is given) are covered with thin narrow strips of rubber so as to guard against any one falling through. The lighting of the rooms comes mainly from the sky light. In gloomy weather it is not enough for the lower stories. Light shafts and the protecting nets are constructed in the same way as in the library of the British Museum in London. Over the openings as has been said in art. 67 are stretched wire nettings to prevent books from falling through. The protecting rods can not be stepped on; if one wishes to reach the upper shelves he must use the foot stools shown in fig. 117 which can be moved easily on their iron frame work. The book rooms run along the street front and are divided by massive ceilings into many stories. The stacks are made of wood and are made accessible in the upper stacks by projecting galleries (see art 67.) The arrangement of the large reading room in the center of the place removed from the noise of the streets as well as placed as near as possible to the stacks is conceded very good. Although the reading room was first completed in 1867, its extent was no more than its demands. It is planned to erect a reading hall of large dimensions on the part of the lot (corner of rue Colbert and rue Vivienne) now occupied with shops and to construct there the administration rooms now temporarily sheltered in the central wing.

109--Example 5.

The Grand ducal court and state Library at Karlsruhe occupies

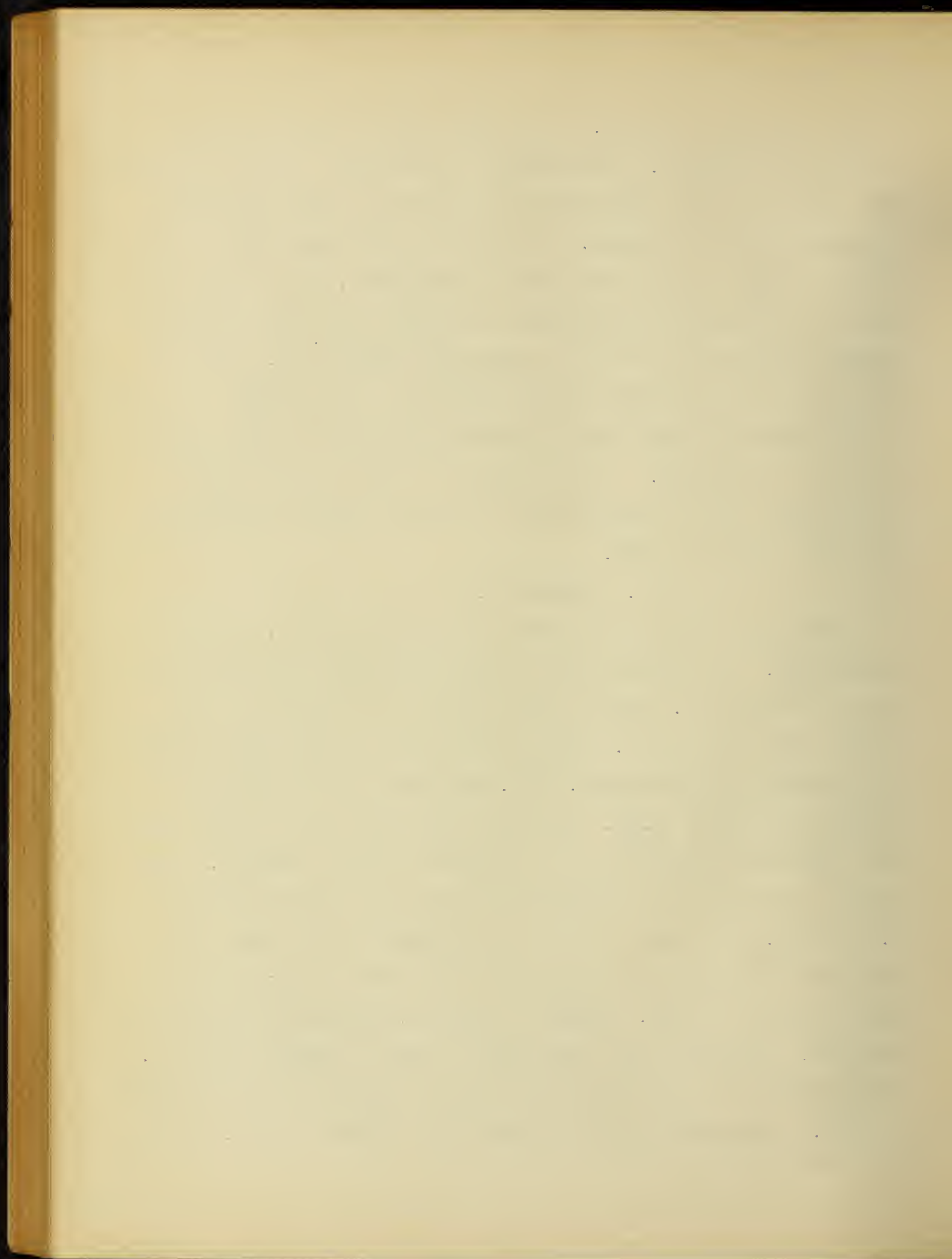
a part of the building erected 1865-73 after a plan of Buckmüller for the united Grand ducal collections, which will be treated under B. (chap. 8) and is sheltered in the upper story. On this account the plan must follow the entire arrangement of that building.(fig. 202-3) The library contains 940,000 v. The building is the shape of a symmetrical horseshoe. On account of sheltering the entire collection of the museum, the hall of antiquities and the cabinet of natural curiosities, on the ground floor a width of windows is allowed which would not be necessary for the library. The allotment of rooms is shown in the plan in fig 202. West of the main stairway lies a vaulted lower stairway as a fire proof approach to the cases holding valuable manuscripts. The administration room, delivery and reading rooms are lodged in the rear of the central building separated from the stacks, still they stand in close connection with one another. These are provided with gas as well as with a common hot water heating, the stacks are not heated. The floors of the stacks in the central building and wings rest on stone pillars and have wood beams, the floor of the rotunda is cemented. At the right and left of it the manuscript rooms have fire-proof floors and ceilings. On the pillars and other columns of the lower floor are fastened other pillars which support the vaulted roof(fig. 203) From the floor up to the top of the vault it is 7.8 m. The entire height is used for storing books. The uprights wooden partitions of the stack run from the ground to the top of the vault. 2.7 m and 5.31 m from the floor in the central building are galleries, in the individual rooms intermediate floors are constructed by which the room is divided into three stories. The stacks of every story are 2.49 m high and the books can be reached everywhere



without the use of ladders. The rotunda hall is lighted by side windows and skylights. The lighting is sufficient, only at the corners where the wings extend from the pavilions, a more extensive lighting would be desirable. On account of the large axis of the window, a large axis of the stacks is necessary. As a result of this, it is possible in the space between the two stacks to place tables and chairs as well as to undertake library work. In every hall stairs lead from one story to another; in the rotunda room and in the manuscript room there are spiral stairs but straight flights are more advantageous. In the passages at the right and left of the rotunda, elevators are provided in which a person can go up or down with a load of books.

110. Example 6.

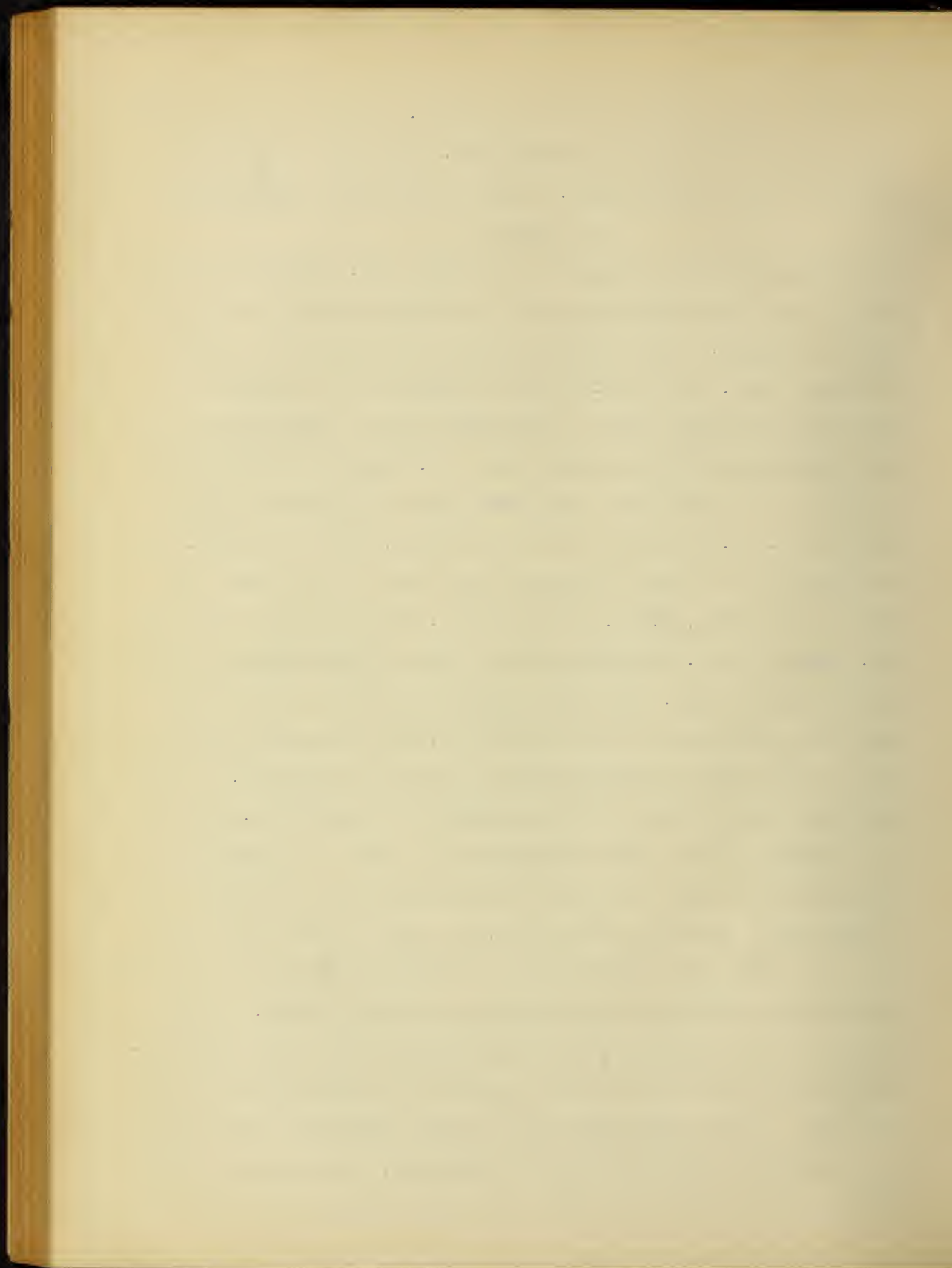
The Royal library at Stockholm contains 300,000 v. and 8000 manuscripts. The building was erected from 1871-77 by Dahl (fig. 204-5) This is 81 m. long and 23m wide and by a massive ceiling divided into two stories. Iron pillars bear I shaped beams between which arches are constructed. Fig. 204 shows the arrangement of rooms on the ground floor. The upper story consists of three large book rooms corresponding to the projecture and the recesses. Each story is divided by two intermediate floors into three stories of 2.38 m (fig. 205) These are made of interrupted cast iron. The openings in the walls are closed with fire-proof doors; the light comes from side lights. Plenty of lifts, elevators, and stairs are provided. Telegraphs and telephones are used to expedite service. The stacks are of iron framework, only the movable shelves are made of wood. The reading room is filled with numbered tables. In the



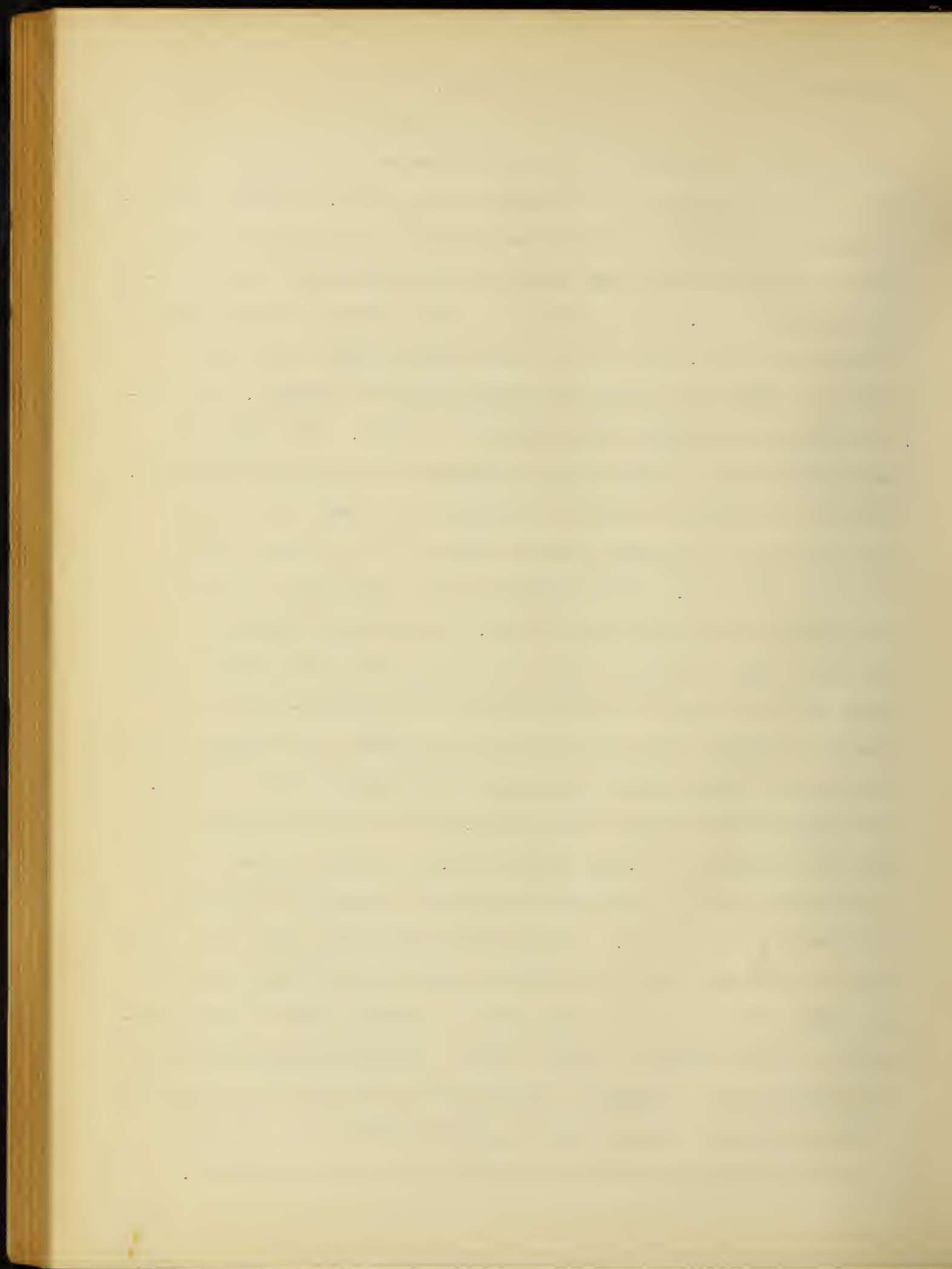
wall cases are a number of reference works. Below the reading room lies an exhibition room for manuscripts. The whole building is heated in winter by hot water. There is sufficient ventilation.

III Example 7

The Royal public library at Stuttgart (fig. 206-8), the plan of which was described in art. 46, was built in 1878-85 after the plan of Landauer. This building consists of a basement, ground and upper floor. In the 3.7 m high basement is the collection of Roman stone pictures found in Württemberg and the carved stone for land surveying while the ground story 5 m. shelters the Württemberg collection of antiquities. The upper story which has an entire height of 9.8 m. serves for the true library, and it contains, as has already been stated in the plan mentioned, in the front, the room for the books, 98 m. long and 29 m. wide while the rear wing 35m. long and 32 m. wide contains the rooms for the public and the administration rooms. The main entrance is at the front of the long wing containing the book collection, open steps and terraces lead to the doorway through which one enters a large hall, at the right and left of which is the collection of antiquities. From the hall extends a broad central passage which leads to a magnificent stairway in the rear wing over which attendants and visitors to the library pass. Ascending the latter, one finds himself in a large hall, from which the reading room, the manuscript room, the delivery room and the administration rooms can be easily reached. A door placed in the transverse axis of the building leads from the delivery room into the stair hall of the stack room and farther on the same axis, a door opens into the extremely beautiful main hall of the building in which are kept fine editions, manuscripts and incunabula some in exhibition cases and some in stacks which are



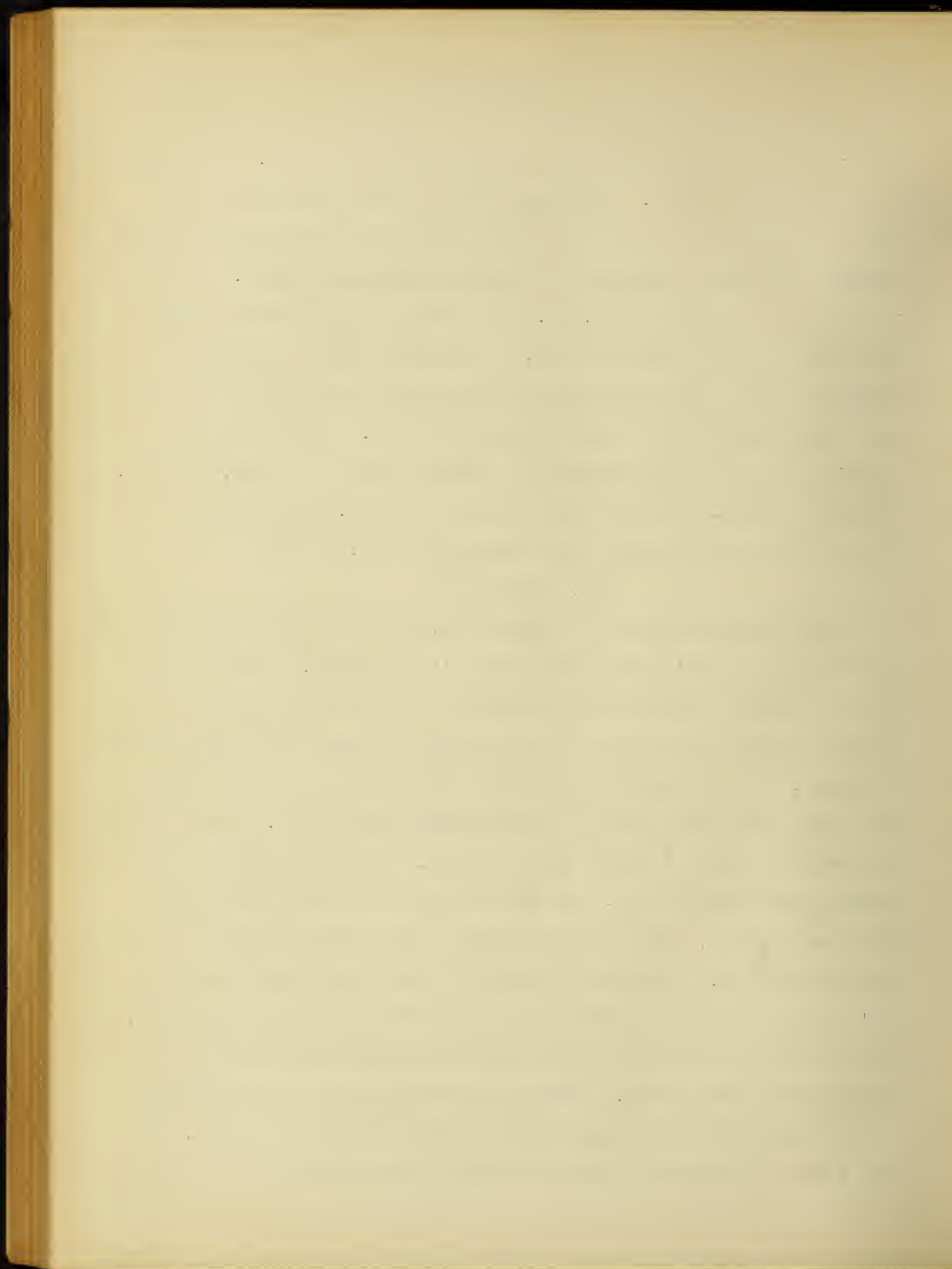
accessible by three stories of galleries. By means of double stairs in the stair hall just mentioned, the galleries are all reached as well as the four stories, in the stack room on both sides of the hall, in the latter six more stairways are placed. The two projecting corners show the possibility of extending the building by two wings projecting at the rear which will give the stack room horse-shoe shape(see fig. 70) The position of the stacks is to be seen in the plan in fig. 208; in the long aisles between them small tables are placed on which books can be laid for perusal. The construction of the stacks was discussed in art 71. The system of stairways is ample. Besides many passenger elevators are provided. Provision is made for warming the stacks with steam but only the pipes are laid. The stacks extend clear to the fire-proof ridge lead under the roof. These originally had a capacity of 300,000 v. Now they can contain twice that much. The ceilings between the ground and upper stories as well as those between the basement and ground story are made of concrete between iron beams- and those between the upper story and the attic of stamped sheet metal. The intermediate floors of the stacks are constructed of oak beams 3.3 cm thick which are laid on iron beams. The stacks are lighted by 31 large side windows of 4.1 m width and 9.66 m height as well as by a sky light which is placed over the entire length of the center aisle between the stacks. In the reading room are three long tables which are covered with green cloth and provided with ink wells and gas coming from the floor. The room is enclosed with a richly decorated ceiling frescoed in blue and red. A magnificent open book-case contains the literature placed for the free use of the readers. In the periodical room just off the reading room, is a case with a large number of pigeon holes which hold 600 periodicals etc.



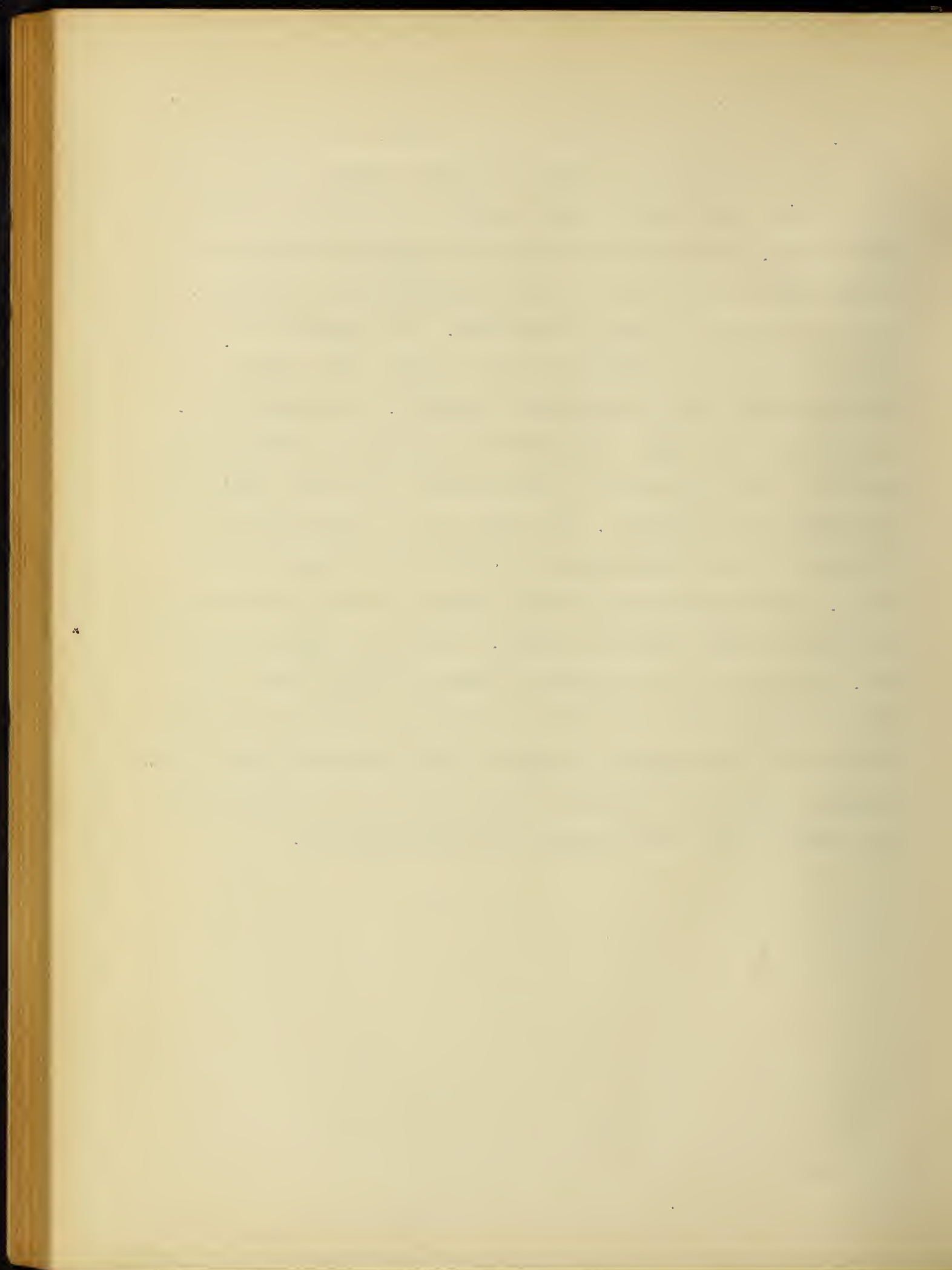
which are taken to the reading room on demand. In the administration wing, all the ceilings are constructed of concrete between iron supports; in the entrance hall and corridor cement is used. All rooms are heated with grates. The outer walls are for the greater part made of squared stone. For the lower part of the building red stone is used, while for the upper part green sandstone is used. The facade system is shown in fig. 85. The front of the building shows rich architectural ornamentation. All parts of the building are provided with a system of pipes over the roof from which the metal roof can be covered with water in case of fire. The cost of the building without the architectural ornamentation is 1, 991,000 mark, in the 3478 sq m. of floor area, 1 sq m cost 454.10 mark and in the 69, 369 cb m of space 1 cb m amounted to 27.76 mark.

112. Example 8.

The Valliano library at Athens (fig. 209) was built in 1882-92 according to Hausen's plan under Ziller's direction. The resources for this public library were provided by the Valliano brothers. This building forms a side piece to the "Academy of knowledge" also erected by Hausen. In the ground plan it separates into a central and two side wings and in height into an upper and lower story. The latter is accessible by a straight open stairway. The side wings as has already been shown in fig. 119 ²⁵ from a large stack room with upper and lower stories. They are united by a low central passage to the central building. The latter contain in the lower story the janitor's rooms, the store rooms and rooms serving other such purposes. In the front of the upper story is the entrance hall on which a large reading room opens. Behind this divided into three stories are the administration rooms and the professors reading rooms. The four little inner courts serve to light the stacks the cross passages



and toilet rooms. Every stack room has five stories of about 2.5 m height. The stacks are entirely made of iron. On the outside the three upper stories form a single structure without any divisions into stories. The reading room, a section of which has already been shown in fig. 117 contains an extensive structure of Ionic marble columns behind which along the walls are stacks and galleries. The hall is principally lighted by skylight. The framework of the roof with iron supports is frescoed in many colors. The reading room and two stack rooms have a capacity of 400,000 v. The facade (fig. 86) is in old Hellenic style and shows in a distinct as well as artistic manner the three divisions of the building. The gables and friezes are adorned with sculpture. The lower part of the building is of limestone from the surroundings of Athens and the upper part of marble. The squared stones are put together without mortar and the joints are slipped into one another. Except the doors no wood is used. The building was erected for about 2,000,000 mark. The conditions which were set forth in art. 46 for the most suitable separation of the building into rooms appear fulfilled here without exception, only the divisions of the stack into two entirely separate rooms is not very favorable for administration.



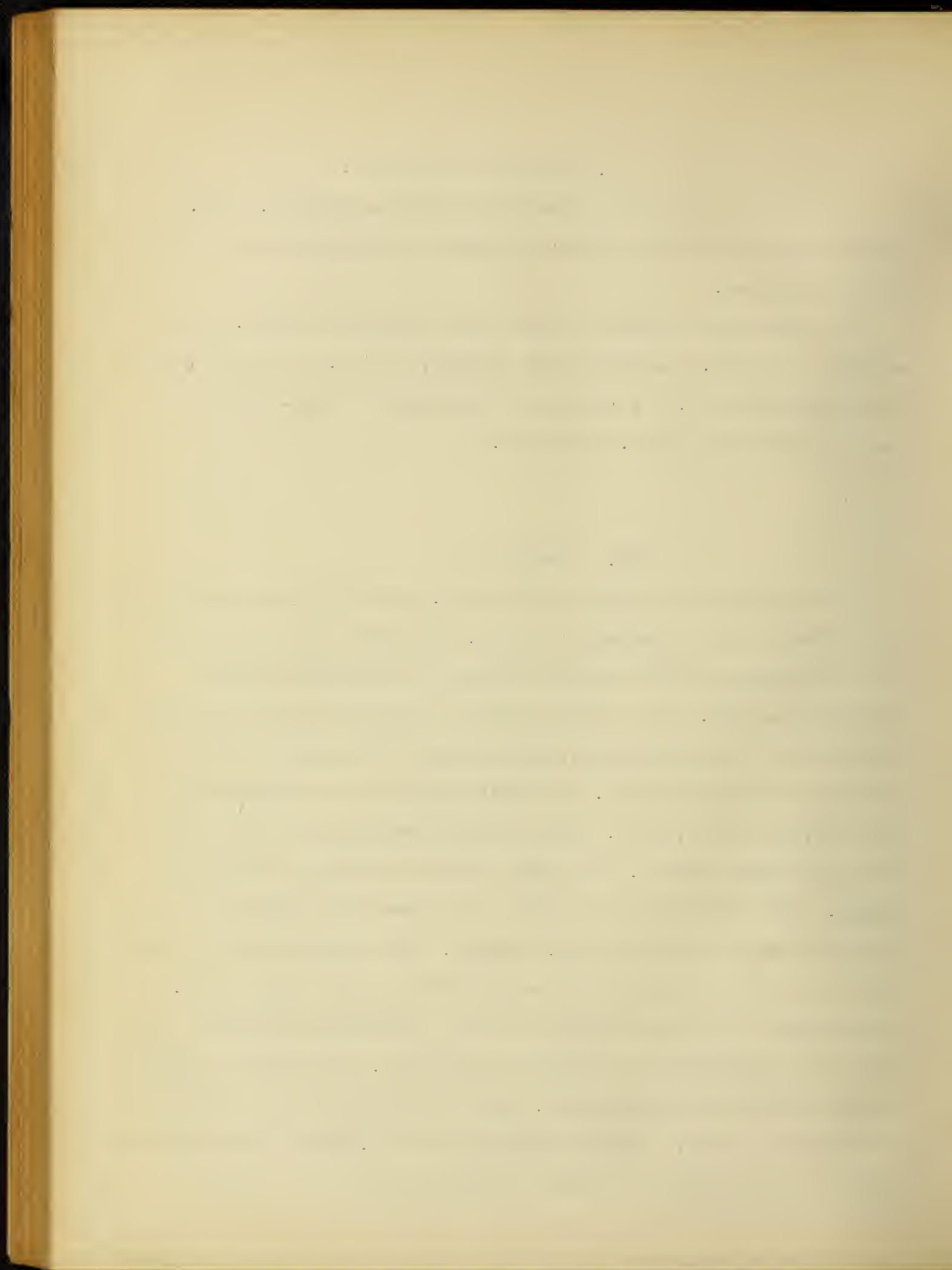
2. University libraries.

As the most important university libraries under b. to d. detailed description was given; of some of these more will be said in the following.

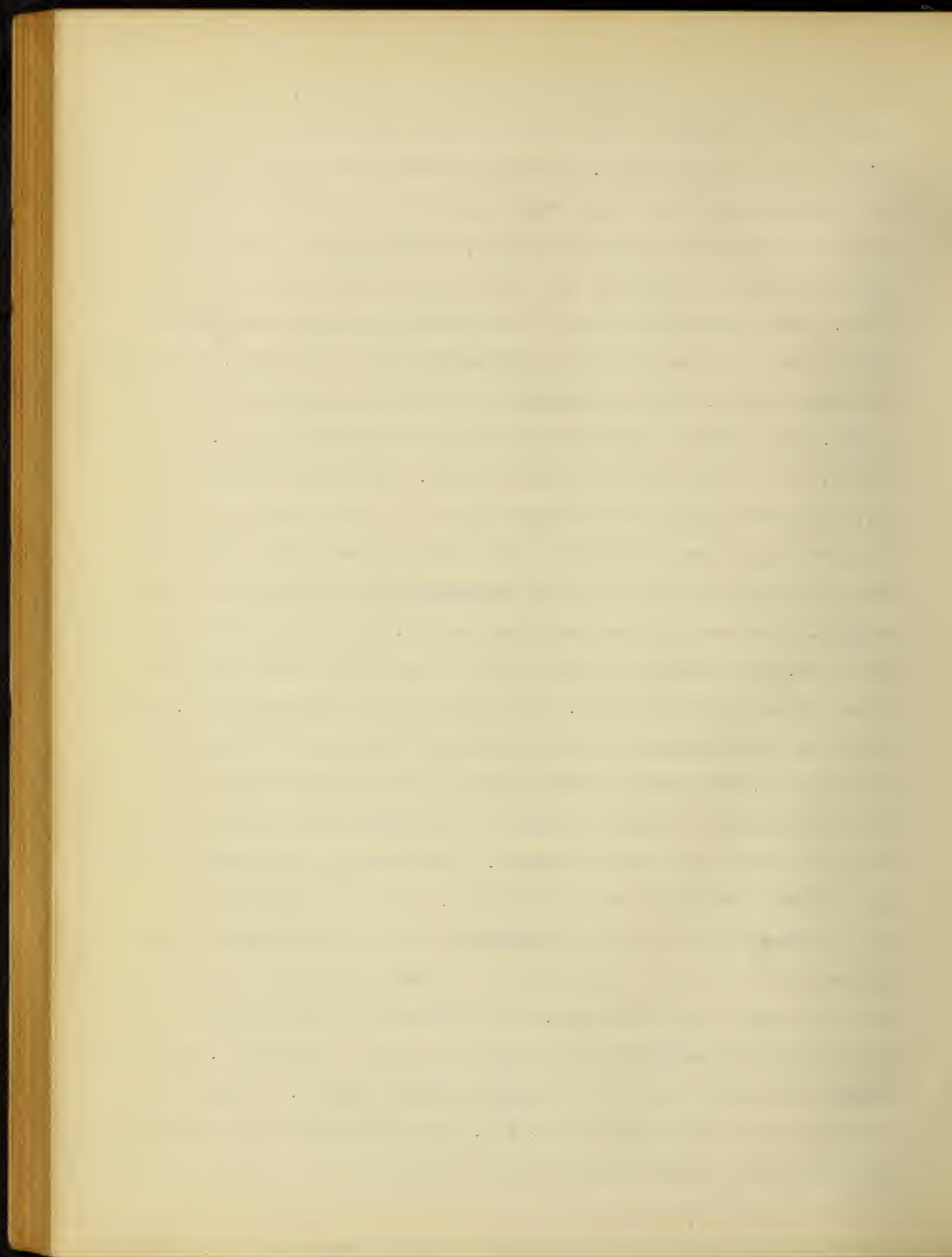
The University library at Kiel was discussed in arts. 46-47, as well as by fig. 87, the one at Leipzig, in art. 46, 50, 89; that at Amsterdam in art. 71, the one at Copenhagen in art. 44 and the one at Strassburg in art. 66 and 72.

113. Example 9

The University library at Halle(fig. 210-211) which was erected from 1878-80 after Tiedemann's plans, together with the library of the University at Griefswald belongs to rectangular shaped buildings(see art. 46) This building is situated at the corner of Friedrich and Wilhelm Strasse, the long axis from east to west is parallel to Wilhelm Strass. The main building has a capacity of from 500,000 to 600,000 v. The building contains a ground floor and three upper stories. The upper two are entirely filled with stacks. The arrangement of rooms in the lower and second story is shown in the two plans in figs. 210-211. The extension of the building on the east was taken into consideration in the whole plan. A cellar under the entire building was not considered necessary, only that part necessary for the heating apparatus. To prevent dampness as has already been said in art. 100, in the part of the building not having a cellar, a hollow chamber of 80 cm. height was constructed, ~~for~~ the ventilation of which was provided for by a suitable heating apparatus.



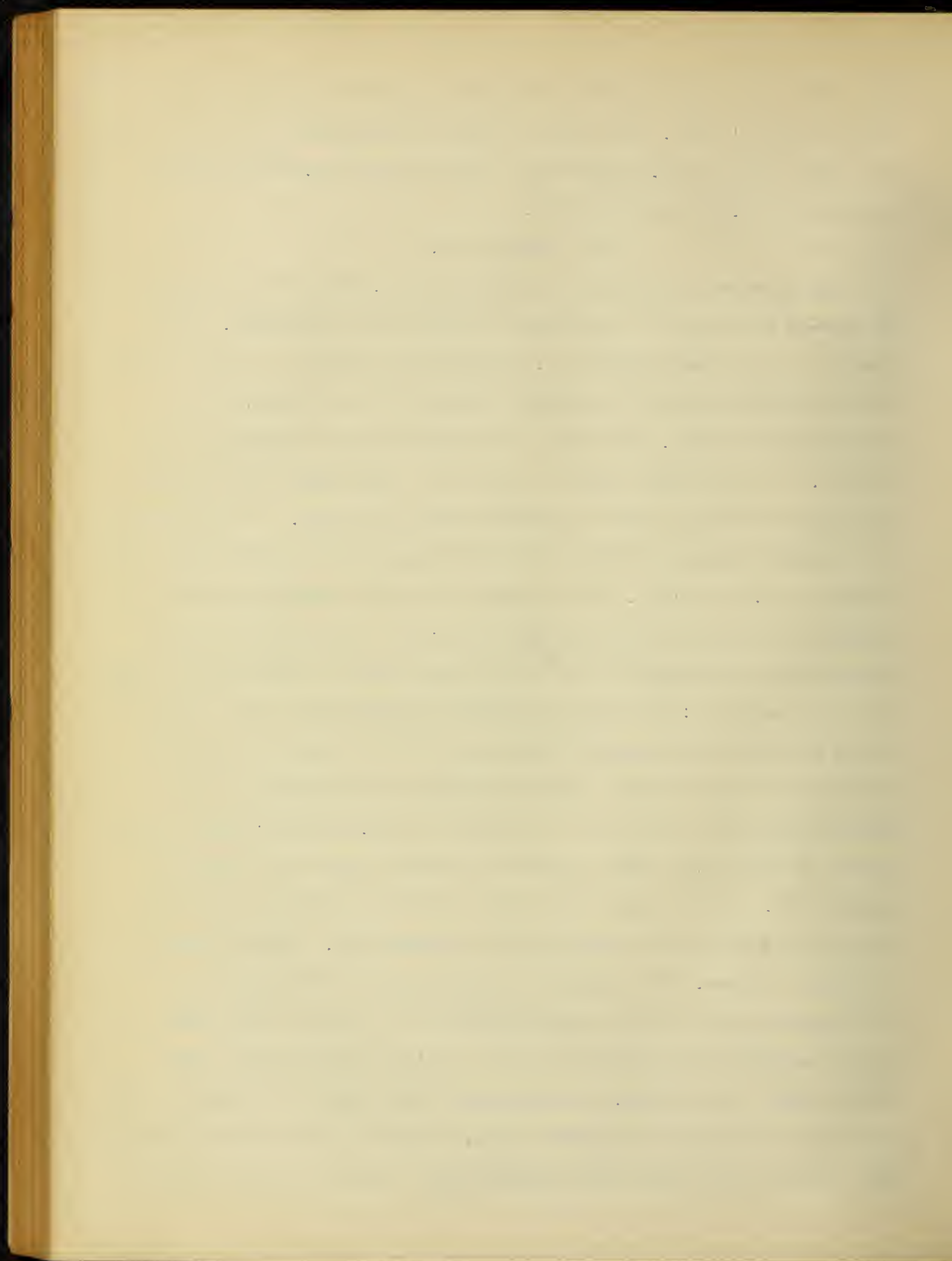
The main staircase of granite is lighted by skylight. The latter would hinder movement in the stack of the third story if it were glazed in the usual manner. Besides the main staircase, in the north east corner is a small stair way for the attendant. So that it may be serviceable in time of fire, it is made of fire proof material (granite supports) and shut off from the stacks with iron doors. For communication within the stacks, two iron stair cases are arranged in the two upper stories one above the other, ascending to central aisle. The arrangement of the stacks has been described in art. 71, a cross section of the latter was given in fig. 123 and in fig. 124 a cross section of the former. The cross section in fig. 124 shows also that the ridge lead of the building are of cast iron, on these rest the portions of I iron and over the latter wood rafters are placed in a suitable inclination for the wood and cement ceiling. The reading room described in art. 89 has a seating capacity of 45. The facade is constructed of brick work with trimmings of cut stone and terra cotta. Fig. 81 shows the system of this. The floors in the passage, stair hall and all book rooms are laid with metal plates. The room for the "Society of the Orient" and the packing rooms have asphalt floors; in the reading and administration rooms oak beams are laid in asphalt. The heating of the room during the winter is done by a hot air furnace. All the rooms in which work is done (the reading room, seminar rooms and the room for the "Society of the Orient") are kept at a temperature of 20 deg. C., the book rooms, manuscript room, the collection of engravings and the library of von Ponikau at a temperature of 10 deg. C. Gas fixtures are only put in the passage and stair halls. Lightning rods have been described in art. 104. The total cost of the building was 375,000 marks which includes the cost of the interior fitt-



ings (286,000), the stacks(12,300 marks) the additional plans and the contractor's fee. The cost in detail is calculated with 890 qm of ground area at 321.20 marks for 1 qm and with 21.802 cbm.solid contents at 13.10 mark for 1 cbm.

114. Example 10.

The University library at Griefswald(fig. 212-213) was built in 1880-82 according to the plans of Gropius and Schmieden. This consists of a cellar reaching 1.2 m above the ground, a ground story and two upper stories of 4,5,5 and 4 height respectively. As the cross section in fig. 93 shows, the stacks extend through all the stories. In the second floor it has three axis while in the ground floor and the third floor it extends around one axis. It is divided by a vaulted ceiling and four iron intermediate floors into six stack stories of 2.5 m height. The stacks are placed over one another in parallel rows and have 2400 qm face area; The intermediate floors consisting of interrupted cast iron plates rest on longitudinal beams and angle supports: the latter connected horizonitally and diagonally at 2 m distance from parallel cross walls which serve as the rear partitions of two stacks. The particular room divisions in the ground and second floor are to be seen in figs. 212-213; the archive placed in the ground floor serves to keep the especially valuable manuscripts. In the third floor near the book rooms are two rooms for the collections of engravings and manuscripts. The building has a hot air furnace. The facade is constructed of brick work in Renaissance style and with slight trimming of red cut stone and yellow mouldings and cornices(see the facade system in fig. 82) The ceilings are vaulted. The open main stair case is of granite and the roof is covered with German slate. The total cost of the building was 217,200 marks which after subtracting the cost of the interior

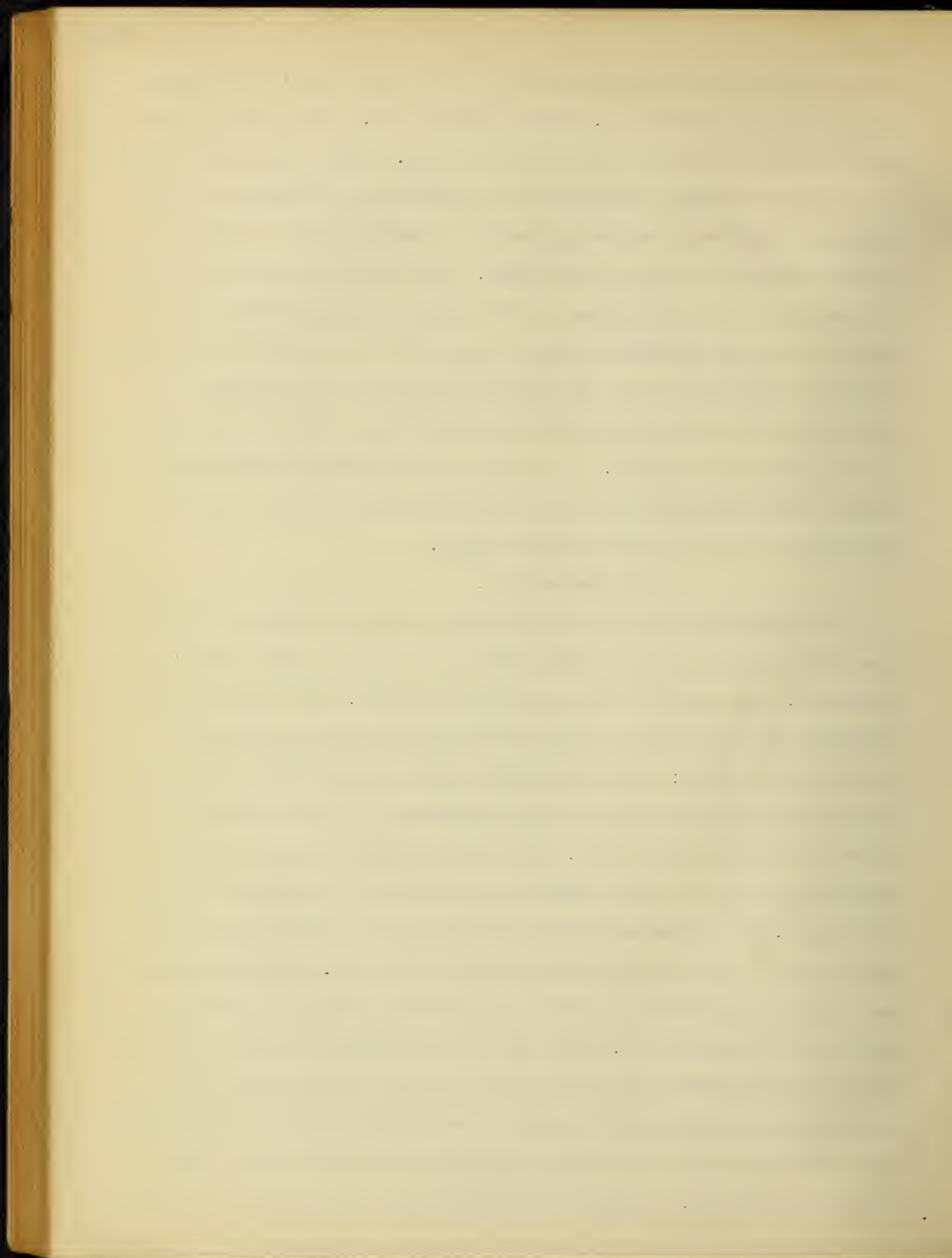


fittings(118,971 marks) the plans and the contractor's fee leaves an estimate for the 529 qm. ground area of 224.8 marks every 1 qm. and for this 9782 cbm. solid contents of 12.1 marks for every 1 cbm.

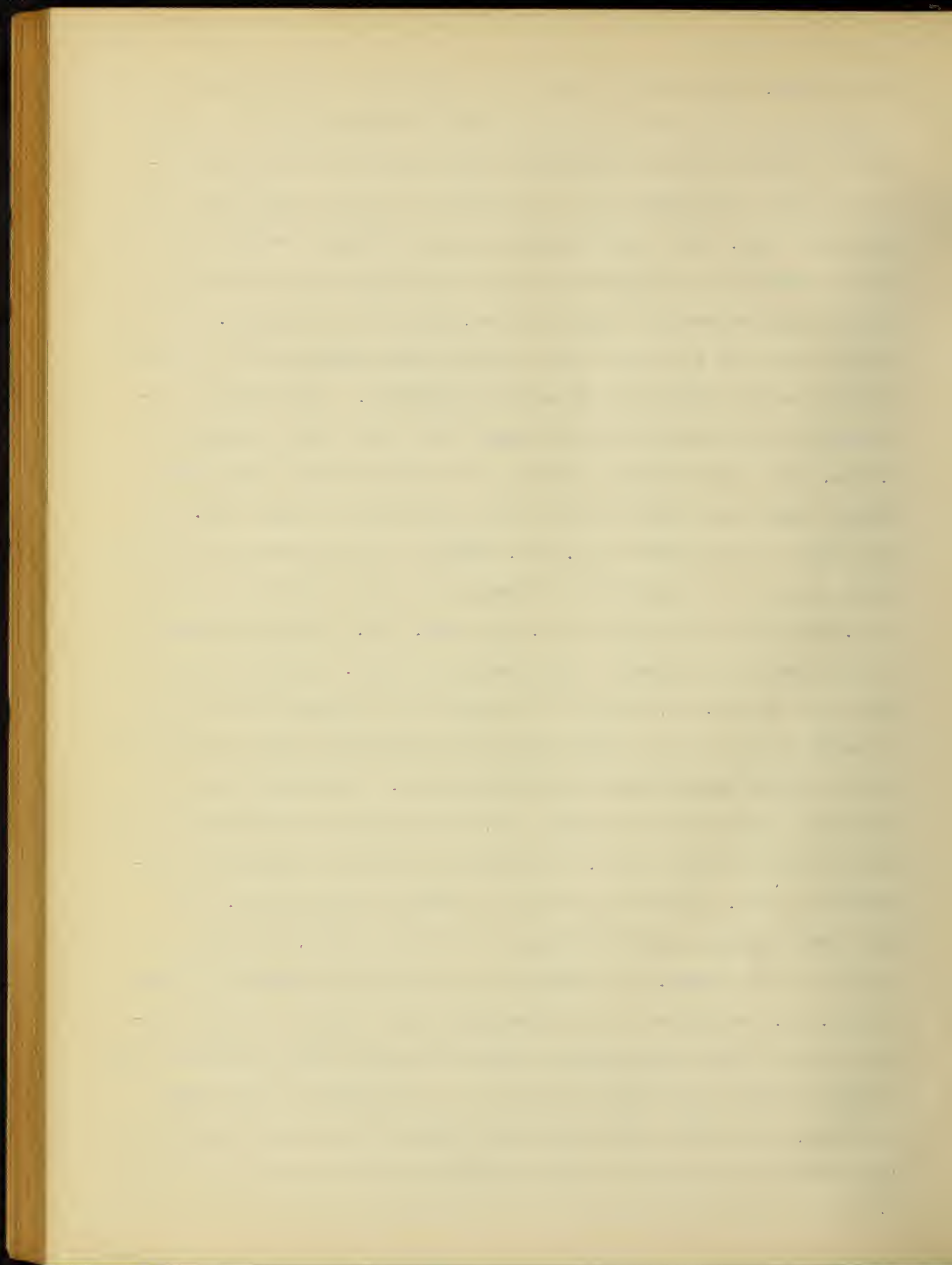
From an economic standpoint the University libraries of Kiel, Halle and Griefswald can be indicated as models since in them the greatest economy of space is obtained. But whether it has been best to adapt all room separations to the construction principles necessary to the most economical use of the space of the stack rooms although the administration and reading rooms have to be adapted to conditions entirely approved to the stack rooms, only a longer use of the library will prove. It appears particularly questionable whether the extension of the buildings first mentioned in case of need could be carried out satisfactorily.

115 Example 11.

The University library at Göttingen is an extension of an old plan which was carried out only partly in 1878-83 under Korten's direction. The plan of the second story in fig. 214 shows the arrangement of the administration and reading rooms in connection with the book rooms; the story under that contains book rooms and in the wing of the building on Prinzenstrasse a little lecture hall as well as the delivery room. The administration rooms with the exception of the delivery rooms are arranged in the center of the whole plan. The characteristic features of the former arrangement must be taken into consideration in the extension. Special emphasis was laid on an undivided height of the story, so that in the old building the height of 5.5m had to be constructed for the story. It was further demanded that the use of the book collections by the professors in their usual way should be granted and for this purpose necessary places and the comfort demanded for study on the spot should be provided. Besides the stacks with ladder system were to



be retained. Since stacks could not be arranged perpendicular to the longitudinal axis of the building without disadvantages the single story in perfecting the arrangement was divided by galleries projecting from the stacks and in this way the use of high ladders was dispensed with. The proportionately great distance between the axis of the windows can be ascribed to this method, but the advantage is gained that between the stacks tables, etc., can be placed. The book rooms in the two stories of the building are separated by a massive ceiling and are connected by massive stairways. The dividing galleries are so arranged that the upper book story has a height of 2.18 m. from the remaining height of the room so that the stacks placed there can be used without the assistance of steps etc. The lower part of the stack of 2.77 m. height is made accessible in the upper shelves by steps which are constructed of projecting plates at 1.07 m height from the floor. (see fig. 121.) The construction of the stacks has already been described in art. 71, that of the galleries in art. 67; flights of stairs at a distance of 15 to 20 m. leads to the latter. Large passenger elevators lessen the running about between the different stories (see art. 70); besides in every story are little hand lifts (see art. 70) placed for comfortable connection with the galleries. The reading room has already been described in art. 89 and explained by various illustrations. The hot water heating extends throughout the work rooms; the book rooms are not heated. The features of the facade system are shown in fig. 80. Leaving out the limitations which existed through connections with the old plan, the whole arrangement for the use of the library as will be established after the completion of the whole building, is a very appropriate one, still on the other hand the separation of the delivery room from the other administration rooms



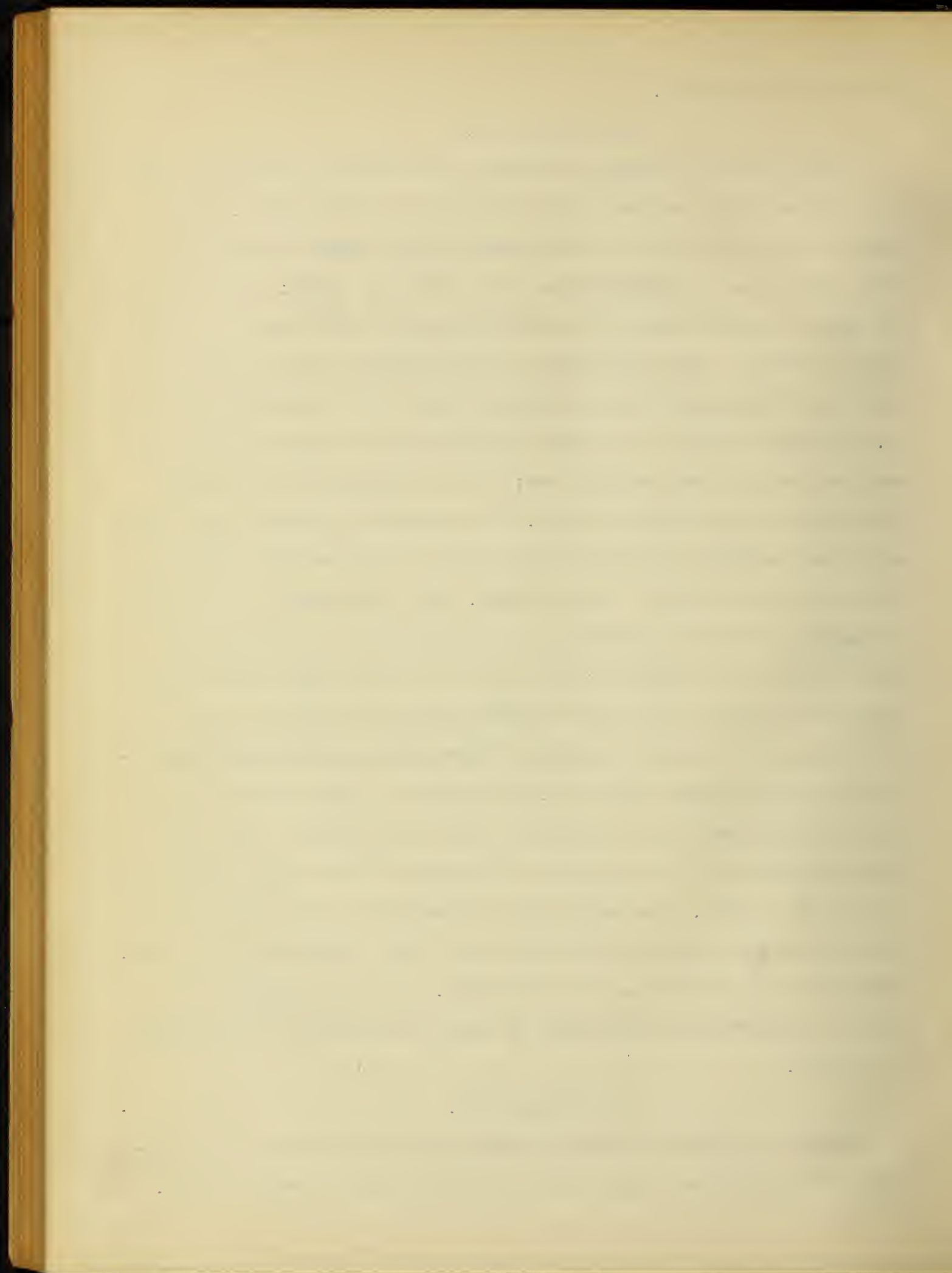
cannot be recommended.

116 Example 12.

The University library at Leyden which contains 300,000 v. and 5,600 manuscripts, was built for the use of an old church. (figs. 215-216) The greater part of the auditorium is used for storing the books, later on an extension for stacks was added; the rooms for the public, manuscripts and administration are sheltered in the new cross building. The arrangement of the delivery room in connection with the reading hall is particularly worthy of notice; the attendant (g. in room 3) can at the same time carry on the work of the loan desk and oversee the reading room; this is separated by a glass partition from the delivery room. In the reading rooms on the walls are placed catalogs and reference books and the necessary desks and tables for writingcards are provided. The auditorium, from which the arched ceiling was removed, is separated into two stories by beams laid on iron supports; the lower story has light frame side lights (through the old church windows) the upper story as well as the extension is lighted by skylight, the latter in insufficient proportions. The lower story of 6.3 m height is separated by a wooden gallery, the upper by an interrupted iron intermediate floor into two stack stories; the extension is divided by three such floors into four stack stories. The part that the protecting rods placed around the light shafts can be used as mounting rods, was shown in art. 68. These are situated 27 cm. from the floor. At every upright of the stacks is screwed an iron handle to which one can hold in climbing on the rod.

117 Example 13.

Formerly university libraries were constructed which were independent buildings and such is generally the case in recent plans.

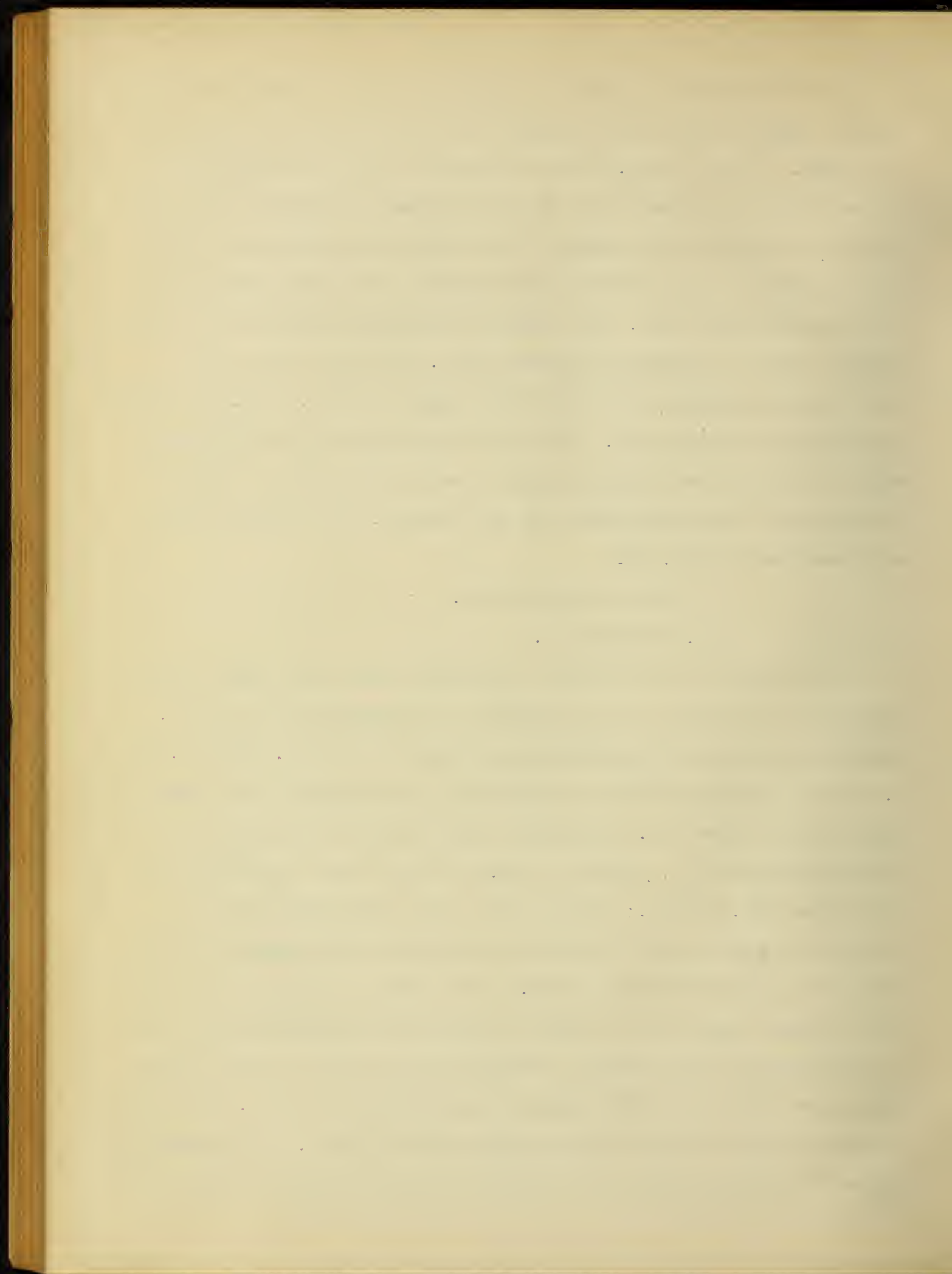


In some few cases the library is sheltered in a special part of the general library hall as for example in the new university building at Vienna. In vol. 4 pt. 6 No. 2 (fig. 39 & 40) the plans of the ground floor and second floor of this college are given; from this it can be seen that the rooms of the University library are placed in the center of the rear building opposite the main entrance and the large assembly hall. The plan of the second story in which the reading room is situated is shown in fig. 188 and in fig. 189 a cross section through the entire rear wing is given. Fig. 217 shows the plan for a stack room. From the entire plan of the college as well as from the two special plans it can be seen that a special stairway has been constructed for the library. The reading room was described in art. 89.

(3) Other Libraries.

118. Example 14.

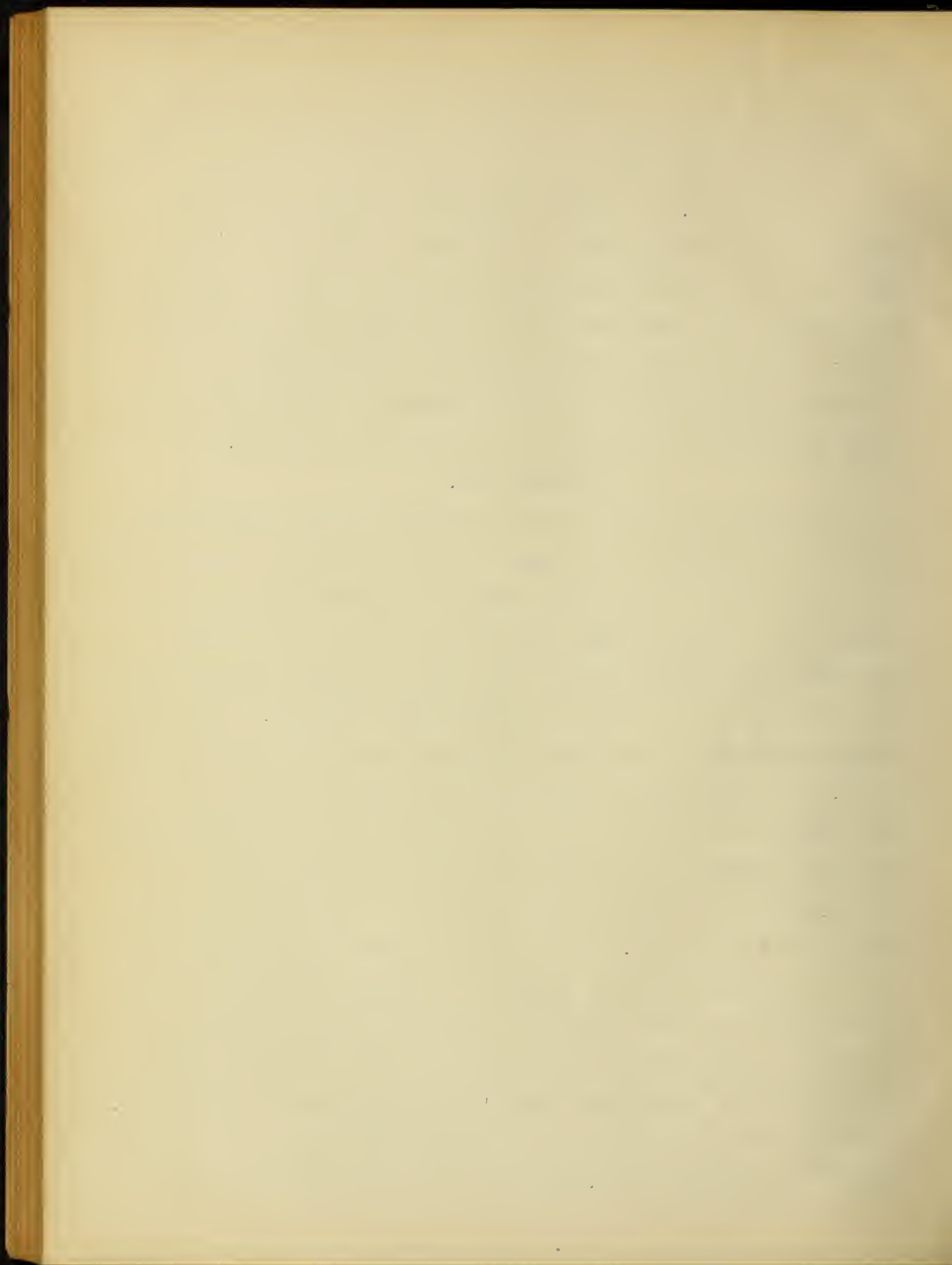
In the University libraries naturally belong the same kind of collections of books as are connected to technical high schools, academies, and special institutes of learning and art. Under b. and c. in this relation, have been discussed the library of the Ecole de droit at Paris(see art. 46 and 88), the library of Wellesley college at Wellesley(see fig. 64) the library of the London institution at London(see art. 89)etc.; in this plan as a good example will be given the library rooms of the new building of the Technical high school at Darmstadt(Wagner, arch.) This library occupies the ground and basement story of the middle wings in the principle axis of the college building and connects immediately with the two main stairways, the latter of which limits the communicating halls. The rooms situated in the ground floor are shown in Fig. 218 . On the east are placed the reading rooms for students and the seminar rooms, the



latter serves also to hold the manuscripts. On the west lie two stackrooms which are shut off above and below by massive ceilings and are each divided into two stack stories by an intermediate floor at the height of 2.5 m. Between the east and west rooms are the rooms for the libraries and his assistants. Under all of these five rooms are as many stacks provided not as the entire height of the basement will contain but only as the height of a stack story 2.5 m; these are limited at the bottom by a massive ceiling construction and under them is a hollow chamber of 90 cm height which keeps the dampness of the ground from the book collection.

119 Example 15.

In respect to a city library mention was already made in art. 67 of the new city library at Cologne. In this place as an example will be given the plans of the city library at Frankfurt-a-Maine (figs. 219-22) This consist of three parts erected at different times. The front longitudinal building was erected in 1820-25 by Hess, and the plans having been approved by Möller were executed. This building is noteworthy for its beautiful proportions and its noble simple style. The ground floor contains only book rooms, as well as the upper story with the exception of two little back rooms which formed the administration room, reading room and librarians' office. The book rooms were constructed on the early practised hall system and provided with galleries. The beautiful entrance hall is made prominent by Marchesis statue of Goethe. In the years 1891 -92 the extension which had been urgent for a long time was carried out in this way, at the rear two wings serving as stack rooms were built. This was done by Wolff after Müller's plan which received the prize. The rooms of the original were for the most part readjusted, as is shown in the ground in fig. 219-220 The reading room centrally

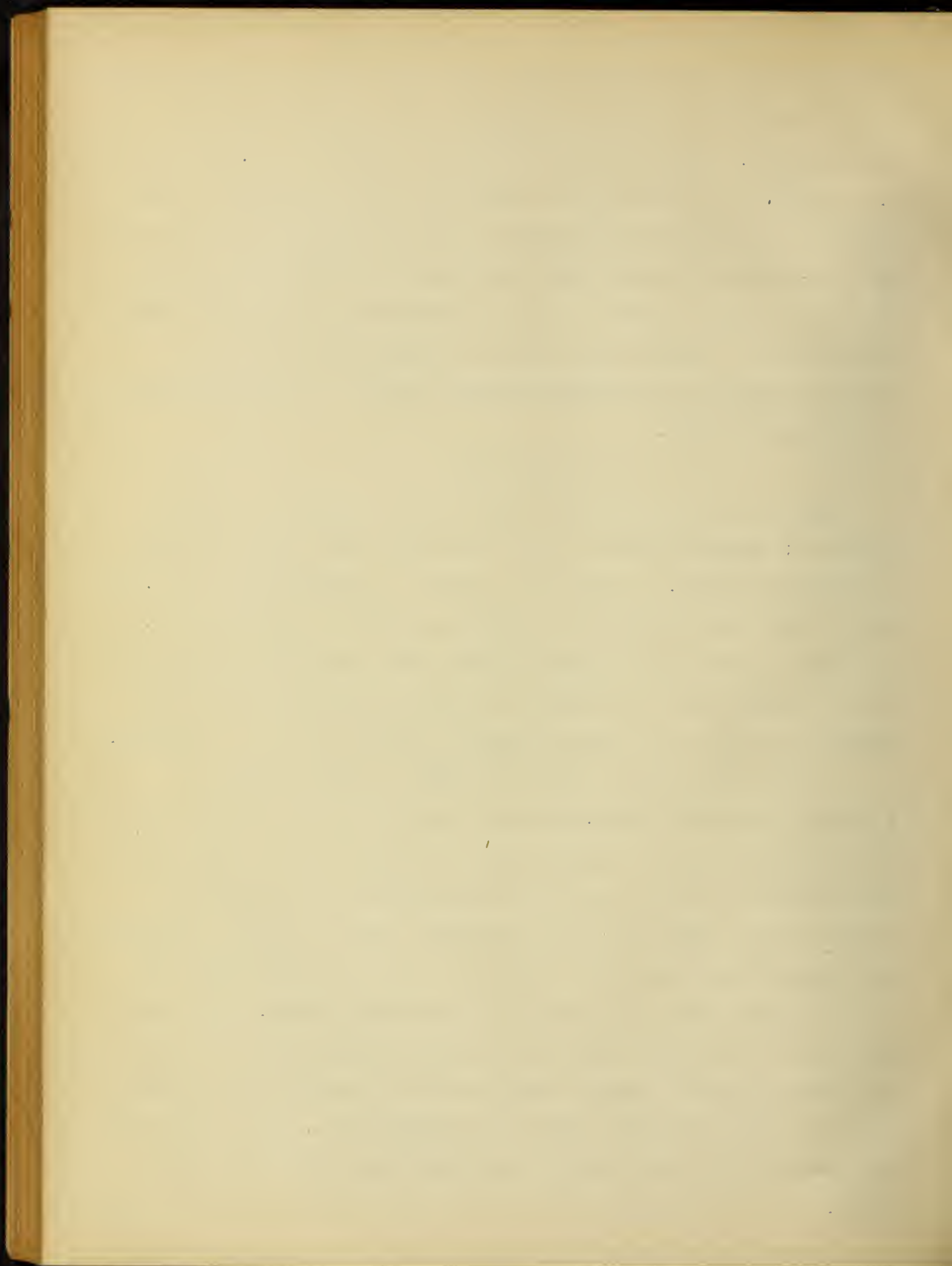


situated in the upper story is the only thing worthy of mention here; the galleries still remain although they are no longer used for storing books. The new stacks contain five stories of 2.45 m and 2.43 m height, the intermediate floors are made of oak and the uprights of the stack are constructed in the way described in art. 61. The book-shelves are laid after the Ebrard and Wolff system which has been described in art. 46. The entrance hall on the outer walls and windows is frescoed after Wolff's design; the ceiling has a painting executed by Kirchbach showing Frankfurt as the protectress of art and knowledge.

120 Example 16

Mention has been made many times in the foregoing to public libraries; the following have been discussed; the Peabody library at Baltimore in fig. 65 the Public library at Minneapolis in fig. 92, 195 and 196, the library at the People's palace at London in art. 81, the Public library at Birmingham in fig. 161, the Public library in Grafton Street East in London (see art. 88). In the following three examples of English and American public libraries will be discussed.

As the first one will serve the Public library at Sale, a suburb of Manchester (fig. 222-223). As the two plans shown, the stack rooms and general reading room are placed in the ground story and the public delivery room is so arranged that the frequenters of the reading rooms will not be disturbed and the library attendant can oversee the whole story; the latter can also be done from any room since they are only separated by glass partitions. By a staircase near by the upper story can be reached where besides the reading room for women a special reading room is situated where dictionaries and other reference works are placed (see art. 88). All the rooms are heated by hot water, only in the librarians room is an open grate.

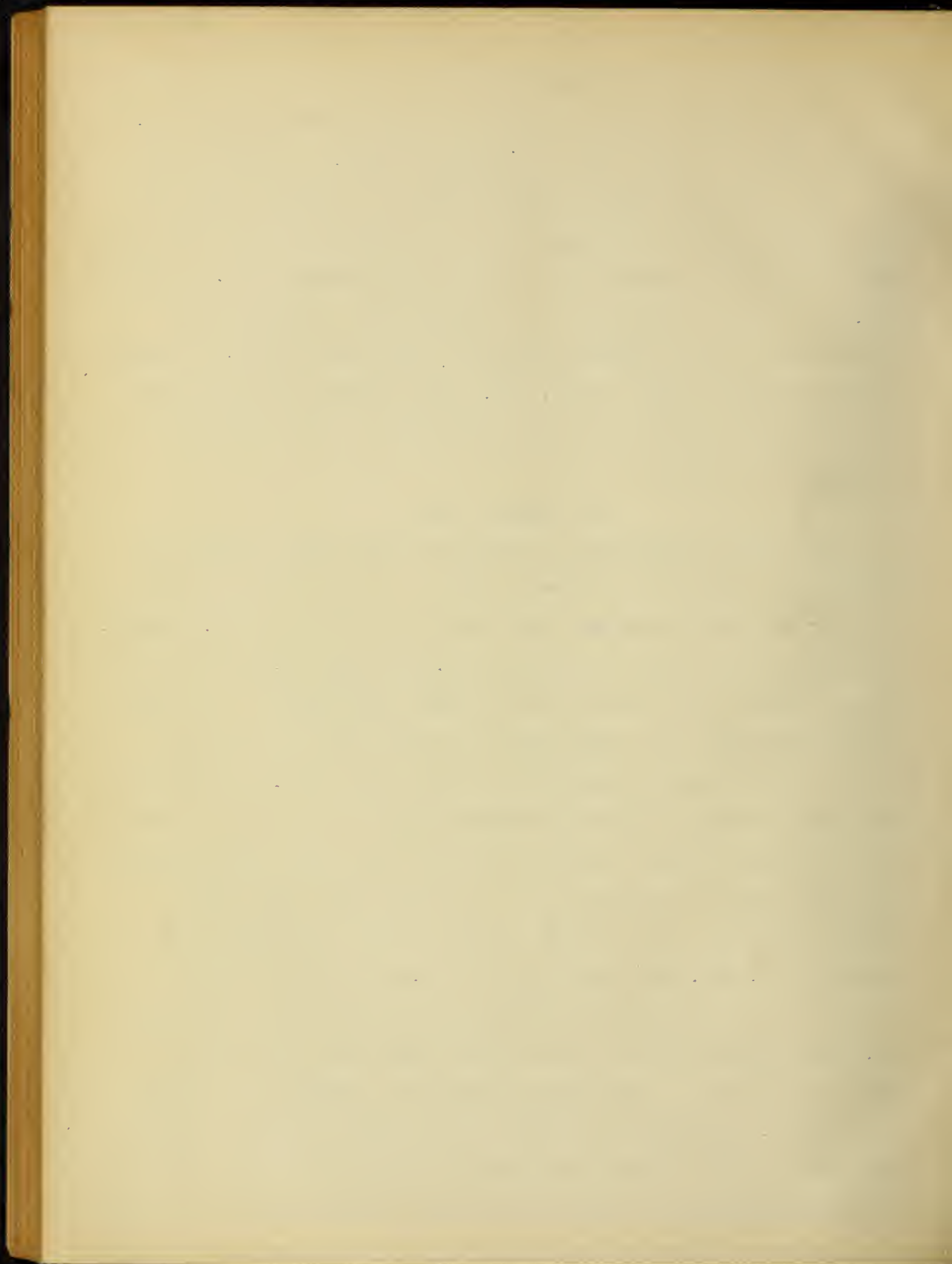


121- Example 117

A small American public library is that at Malden, Mass.(fig. 224-226) which is built after Richardson's plans. As is seen from the plan, the stack room and reading room are in direct connection so that books wanted for reading can be brought out between two arch ways. The stacks provided with galleries are shown in fig. 114 while fig. 226 shows the interior of the reading room. A passage way which serves for art exhibits separates the library rooms: the seats placed here can be seen in fig. 227. The exterior of this library whose style is patterned after the monasteries of the middle ages. is shown in fig. 224.

122- Example 118.

One of the largest public libraries in the Public library at Boston which was built in 1888-90 after the plans of Mc Kim, Mead & White; the plan of the two upper stories is given in figs. 229-230. This library building is a rectangle 68.58 m long; 69.8 m deep; the front, rear and side wings enclose a large inner court. The ground floor of the front wing contains the entrance hall in the center which leads to the main stair case, at the left(south) of that are the catalog room and the other administration, at the right (north) are the rooms for maps, bound periodicals, duplicates and pamphlets; the rear wing and the greater part of the two side wings form a large stack room. The division of rooms in the second floor is shown in fig. 229. The reading room is 66.44 m. long and 128 m. deep; it extends through the two upper stories and has a height of 15.24 m; at both ends are semi-circular rooms shut off by grill work, one of which is assigned to holding the catalog , the other for writing. The interior as shown in fig. 228, is richly decorated and lined with a high oak wainscoting. The third story (fig. 230) chiefly contains books rooms, these belong to the special libraries.

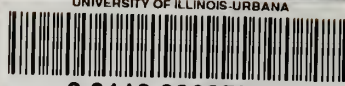


The stacks run through three stories of the building and are divided into six stack stories of 2.285 m height. Granite was used for the exterior of the building and rich marble entrance is adorned with statues.





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